Allen-Bradley

DeviceNet Modules in Logix5000™ Control Systems

1734-ADN, 1734-ADNX, 1734-PDN, 1756-DNB, 1769-SDN, 1784-PCIDS, 1788-CN2DN, 1788-DNBO, 1788-EN2DN, 1794-ADN

User Manual

Rockwell Automation

Important User Information

Solid state equipment has operational characteristics differing from those of electromechanical equipment. *Safety Guidelines for the Application, Installation and Maintenance of Solid State Controls* (Publication SGI-1.1 available from your local Rockwell Automation sales office or online at http://www.ab.com/manuals/gi) describes some important differences between solid state equipment and hard-wired electromechanical devices. Because of this difference, and also because of the wide variety of uses for solid state equipment, all persons responsible for applying this equipment must satisfy themselves that each intended application of this equipment is acceptable.

In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

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Throughout this manual we use notes to make you aware of safety considerations.

WARNING

Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.

IMPORTANT

Identifies information that is critical for successful application and understanding of the product.

ATTENTION

Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you:

- identify a hazard
- avoid a hazard
- recognize the consequence

SHOCK HAZARD

Labels may be located on or inside the drive to alert people that dangerous voltage may be present.

BURN HAZARD

Labels may be located on or inside the drive to alert people that surfaces may be dangerous temperatures.

About This Manual

The manual is one of various Logix5000 manuals.

To:	See:
get started with a Logix5000 controller	*DeviceNet Modules in Logix5000™ Control Systems*, publication 1756-QS001
Look up abbreviated information and procedures regarding programming languages, instructions, communications, and status	*Logix5000 Controllers System Reference*, publication 1756-QR007
program a Logix5000 controller—detailed and comprehensive information	*Logix5000 Controllers Common Procedures*, publication 1756-PM001
program a specific Logix5000 programming instruction	• *Logix5000 Controllers General Instructions Reference Manual*, publication 1756-RM003 • *Logix5000 Controllers Process and Drives Instructions Reference Manual*, publication 1756-RM006 • *Logix5000 Controllers Motion Instruction Set Reference Manual*, publication 1756-RM007
import or export a Logix5000 project or tags from or to a text file	*Logix5000 Controllers Import/Export Reference Manual*, publication 1756-RM084
convert a PLC-5 or SLC 500 application to a Logix5000 project	*Logix5550 Controller Converting PLC-5 or SLC 500 Logic to Logix5550 Logic Reference Manual*, publication 1756-6.8.5
control devices over an EtherNet/IP network	*EtherNet/IP Modules in Logix5000 Control Systems User Manual*, publication ENET-UM001
control devices over an ControlNet™ network	*ControlNet Modules in Logix5000 Control Systems User Manual*, publication CNET-UM001
You are here control devices over an DeviceNet™ network	*DeviceNet Modules in Logix5000 Control Systems User Manual*, publication DNET-UM004

This manual guides the development of a control system that uses a Logix5000™ controller and a DeviceNet™ network. A Logix5000 controller is any of the following:

- 1756 ControlLogix® controllers
- 1769 CompactLogix™ controllers
- 1789 SoftLogix5800™ controllers
- 1794 FlexLogix™ controllers
- PoweFlex®700S with DriveLogix™ controllers

Who Should Use this Manual

This manual is for those who program or maintain industrial automation systems.

To use this manual, you must already have experience with:

- programmable controllers
- industrial automation systems
- personal computers and Windows® 95, Windows 98, Windows NT®, or Windows 2000 operating system

Conventions in this Manual

As you use this manual, you will see some terms that are formatted differently from the rest of the text:

Text that is:	Identifies:	For example:	Means:
Italic	the actual name of an item that you see on your screen or in an example	Right-click *User-Defined* …	Right-click on the item that is named User-Defined.
`courier`	information that you must supply based on your application (a variable)	Right-click `name_of_program` …	You must identify the specific program in your application. Typically, it is a name or variable that you have defined.
enclosed in brackets	a keyboard key	Press [Enter].	Press the Enter key.

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Give a Value Its Own Memory Location

Before You Begin

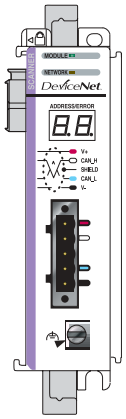
What This Manual Covers

This manual guides the development of a control system that uses a Logix5000™ controller and a DeviceNet™ network. This manual shows how to:

- connect the controller to the network
- establish control of the devices
- interlock and share input data
- access the network via an operator or HMI terminal
- interpret status and diagnostic information

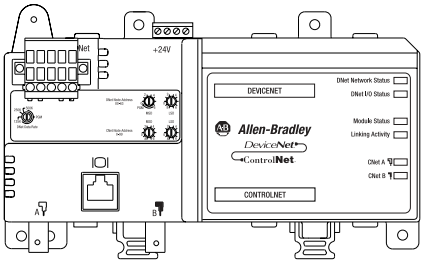
To control the devices on a DeviceNet network, a Logix5000 controller uses one of the following scanners:

CompactLogix™ Scanner 1769-SDN

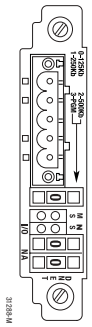


ControlLogix® Scanner 1756-DNB

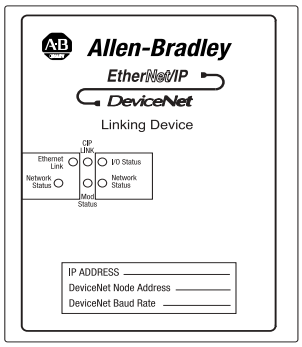
ControlNet to DeviceNet Linking Device 1788-CN2DN



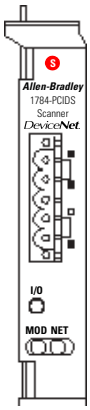
DriveLogix™ and FlexLogix™ Communication Card 1788-DNBO



EtherNet/IP to DeviceNet Linking Device 1788-EN2DN

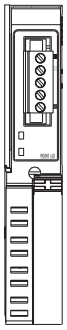


SoftLogix™ 5800 Scanner 1784-PCIDS

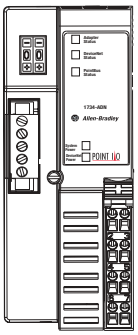


This manual also provides a basic level of information to use the following devices on your DeviceNet network.

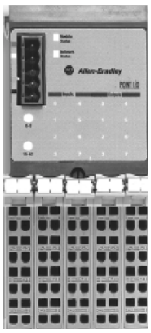
POINT™ I/O Interface 1734-PDN



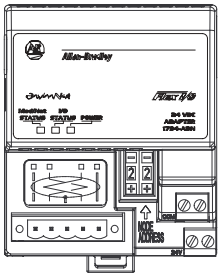
POINT™ I/O Adapter 1734-ADN and 1734-ADNX



POINT™Block I/O Module 1734D



FLEX™ I/O Adapter 1794-ADN

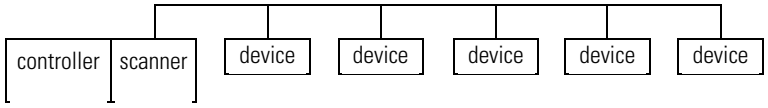


Preliminary Actions

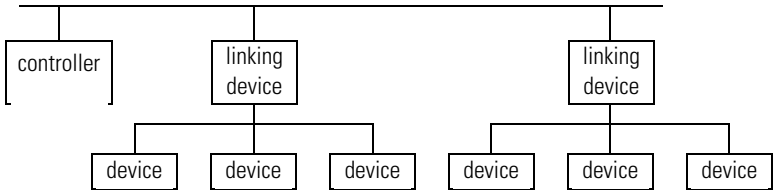
Before you configure and program your DeviceNet network, complete the following actions:

❑ 1. Choose whether to use a single network or several distributed networks. (For more information, see page 1-5.)

❑ single network



❑ several smaller distributed networks (subnets)



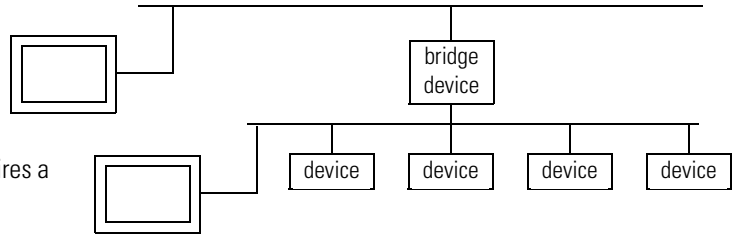
❑ 2. Choose a scanner. (For more information, see page 1-5.)

If you are using:	And the main network is:	Use this scanner:
single network	→	Corresponding scanner for your controller
subnets	EtherNet/IP	EtherNet/IP to DeviceNet Linking Device 1788-EN2DN
	ControlNet™	ControlNet to DeviceNet Linking Device 1788-CN2DN

❑ 3 Choose how to connect your computer to the DeviceNet network. (For more information, see page 1-6.)

Connect to another network and bridge to the DeviceNet network. Requires a bridge device.

Connect directly to the DeviceNet network. Requires a DeviceNet interface device.



❑ 4. Choose a baud rate. (For more information, see page 1-9.)

- ❑ 125K bit/s (default— good starting point)
- ❑ 250K bit/s
- ❑ 500K bit/s

❑ 5. Calculate how much scanner memory you need. (For more information, see page 1-11.)

A. List the devices on your network.

B. Record how many bytes each device sends to your control system (input data) and gets from your control system (output data).

Device	Address	Input Size of Device (bytes)	Input Memory in Scanner (DINTs)	Output Size of Device (bytes)	Output Memory in Scanner (DINTs)
start/stop buttons		1	1	1	1
<empty>			2		2
I/O adapter w/ modules		9	3	5	2
<empty>			2		2
	Total		8		7

E. Total memory that you need in the scanner.

C. Convert the input and outputs sizes to DINTs, where:
DINTs = (bytes/4) rounded up to an integer.

D. Add several DINTs between each device in case you want to make changes later.

❑ 6. Assign an address to each device. The following addresses are recommended but not required. (For more information, see page 1-13.)

Tip: For flexibility as you develop your system, leave gaps between addresses. Gaps have *no* effect on system performance.

Give this address:	To this device:
0	Scanner
1 to 61	Your devices Give the lower addresses to devices with 15 bytes or more of input or output data.
62	Computer interface, such as a 1770-KFD or 1784-PCD device
63	Leave open for new or replacement devices.

❑ 7. Make sure you have the required software.

❑ To configure the network:

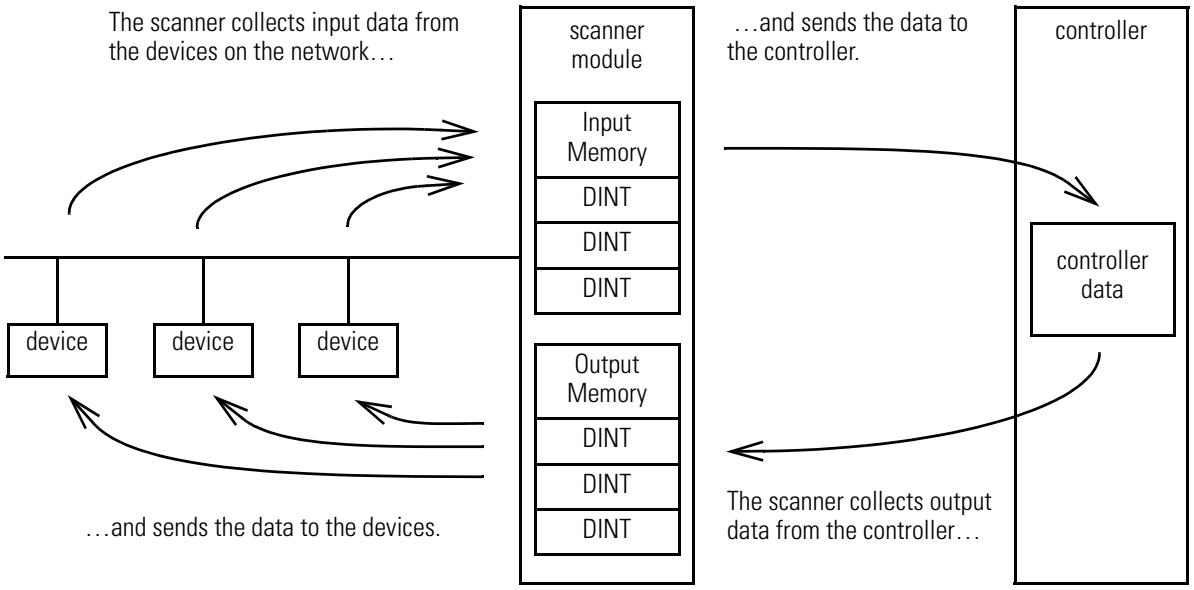
If:	And your scanner is:	Configure the network with:
every device on your network (except the scanner) uses 4 or less bytes of input and output data	• ControlLogix® 1756-DNB • FlexLogix™ 1788-DNBO	RSLogix™ 5000 software (For more information, see chapter 4.)
some devices use more than 4 bytes of input or output data	any	RSNetWorx™ for DeviceNet software (For more information, see chapters 2 and 6.)

❑ To program the controller, use RSLogix™ 5000 software.

❑ To connect your computer to the network, use RSLinx® software.

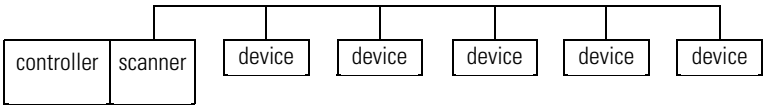
Choose a Scanner

The DeviceNet scanner connects a controller to the devices on a DeviceNet network.

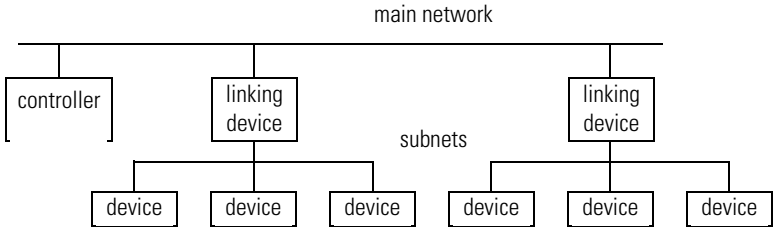


To organize your devices into a DeviceNet network, either:

Place all your devices on a single network and connect the controller directly to the network via the scanner.



Break up your devices into several smaller distributed networks (subnets). Place a scanner (linking device) on each network. Connect the scanners to the controller via an EtherNet/IP or ControlNet network (backbone).



This option:	Has these advantages:	And these disadvantages:
single network	• lower cost • 1 network to manage • scanner is local to the controller	• shorter distances • more devices on the network = slower performance on that network • more power supply requirements
subnets	• shorter runs on subnets, more total distance • fewer devices on the subnet = faster performance on the subnet • simpler power supply requirements	• higher cost • multiple networks to manage • scanner is remote from the controller

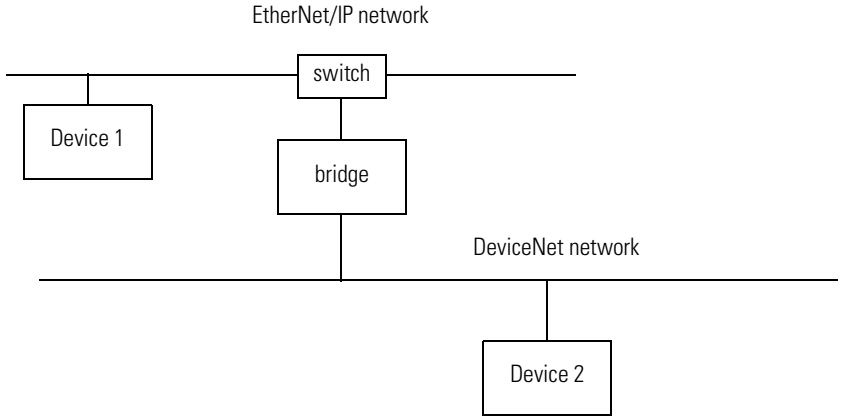
To choose a scanner, use the following table:

If you are using:	And:	Use this scanner:
single network	CompactLogix™ controller	CompactLogix 1769-SDN
	ControlLogix® controller	ControlLogix 1756-DNB
	DriveLogix™ controller	DriveLogix and FlexLogix 1788-DNBO
	FlexLogix™ controller	
	SoftLogix™ 5800 controller	SoftLogix5800 1784-PCIDS
subnets	EtherNet/IP main network	EtherNet/IP to DeviceNet Linking Device 1788-EN2DN
	ControlNet main network	ControlNet to DeviceNet Linking Device 1788-CN2DN

Bridging Across Networks

Logix5000™ devices can usually communicate with devices on other networks with no additional configuration or programming.

- A bridge connects two different networks. The bridge is either:
  - single device with communication ports for two different networks
  - separate communication devices in the same chassis
- For example, the bridge device shown below is connected to both EtherNet/IP and DeviceNet networks. Device 1 on EtherNet/IP can communicate with Device 2 on DeviceNet through the bridge.



Communication can bridge these networks:.

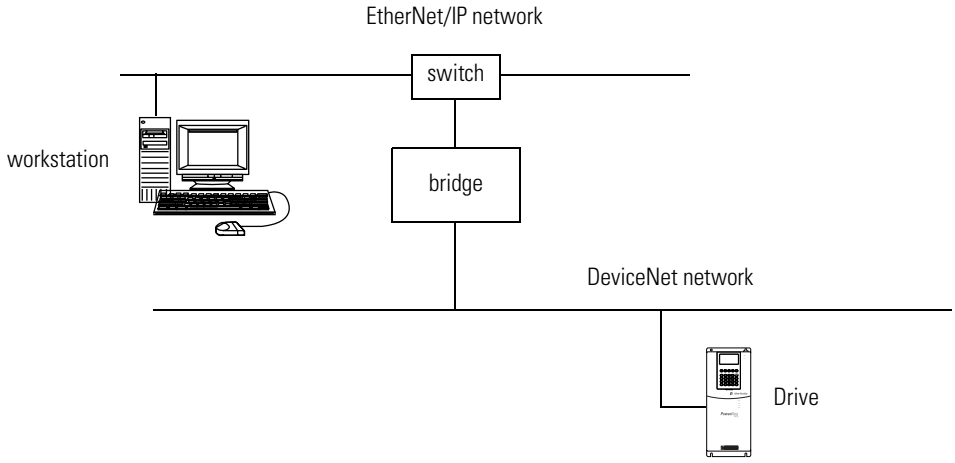
A device on this network	**Can access a device on this network:**			
	EtherNet/IP	**ControlNet:**	**DeviceNet:**	**RS-232[2]:**
EtherNet/IP	yes	yes	yes	yes
ControlNet	yes	yes	yes	yes
DeviceNet	no	no	yes	no
RS-232	yes	yes[1]	yes	yes

(1) To use RSNetWorx software to configure and schedule a ControlNet network, we recommend that you either:

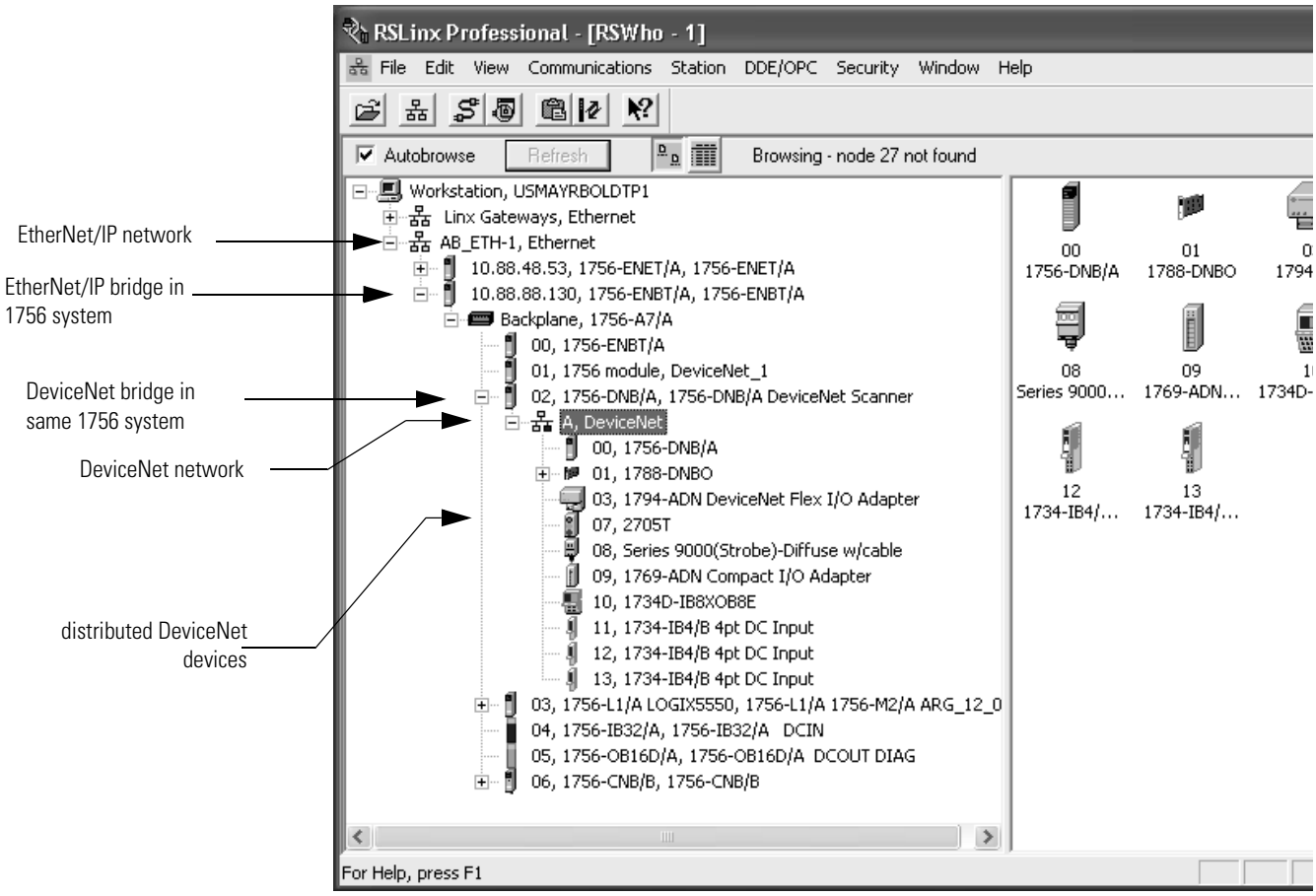
- connect to an EtherNet/IP network and bridge to the ControlNet network
- use a 1784-PCC interface device to connect directly to the ControlNet network

(2) Typically, this is a point-to-point connection between a Logix5000 controller and another device, such as a PanelView™ Plus operator terminal.

In this example, a workstation configures a drive on a DeviceNet network. The workstation bridges EtherNet/IP to reach the drive.



This example RSLinx window shows how the DeviceNet bridge links to the EtherNet/IP network:



Choose a Baud Rate for the Network

The default baud rate for a DeviceNet network is 125K bits/s. This is the easiest baud rate to use and is usually sufficient.

The 2 most common methods to set the baud rate of a device are:

Method:	Description:
autobaud feature	At power up, the device automatically sets its baud rate to the baud rate of the first device it hears on the network. It remains set until the device powers up again. The network requires at least one device with a fixed baud rate so the autobaud devices have something against which to set. Typically, scanners and network interfaces have a fixed baud rate.

switches or pushbutton on the device	Some devices have switches or a pushbutton that set the baud rate.
	• The device reads the switch setting at power up.
	• Typically, the switch lets you select either:
	  • autobaud
	  • fixed baud rate of 125K, 250K, or 500K
	• If you change the switch setting, you have to cycle power to the device before the change to takes effect.
	There are exceptions. For example, the 1756-DNB module has a pushbutton, which only lets you set the baud rate if the module is unconnected from the network or network power is off. Once you change the baud rate, the module automatically resets to the new baud rate.

software	Some devices require a programming device to set its address. For example, you can use your computer and the DeviceNet Node Commissioning tool (software) to set the baud rate of a device. The Node Commissioning tool is available: • automatically when you install RSNetWorx for DeviceNet software • as a separate application on the RSLogix 5000 software CD, revision 13.0 or later

If You Want to Use a Higher Baud Rate…

The length of the trunkline and type of cable determines which baud rates you can use:

Baud rate	Maximum distance			Cumulative drop line length
	flat cable	thick cable	thin cable	
125K bit/s	420m (1378 ft)	500m (1640 ft)	100m (328 ft)	156 m (512 ft)
250K bit/s	200m (656 ft)	250m (820 ft)	100m (328 ft)	78m (256 ft)
500K bit/s	75m (246 ft)	100m (328 ft)	100m (328 ft)	39m (128 ft)

If you change the baud rate of your network, make sure that all devices change to the new baud rate. Mixed baud rates produce communication errors.

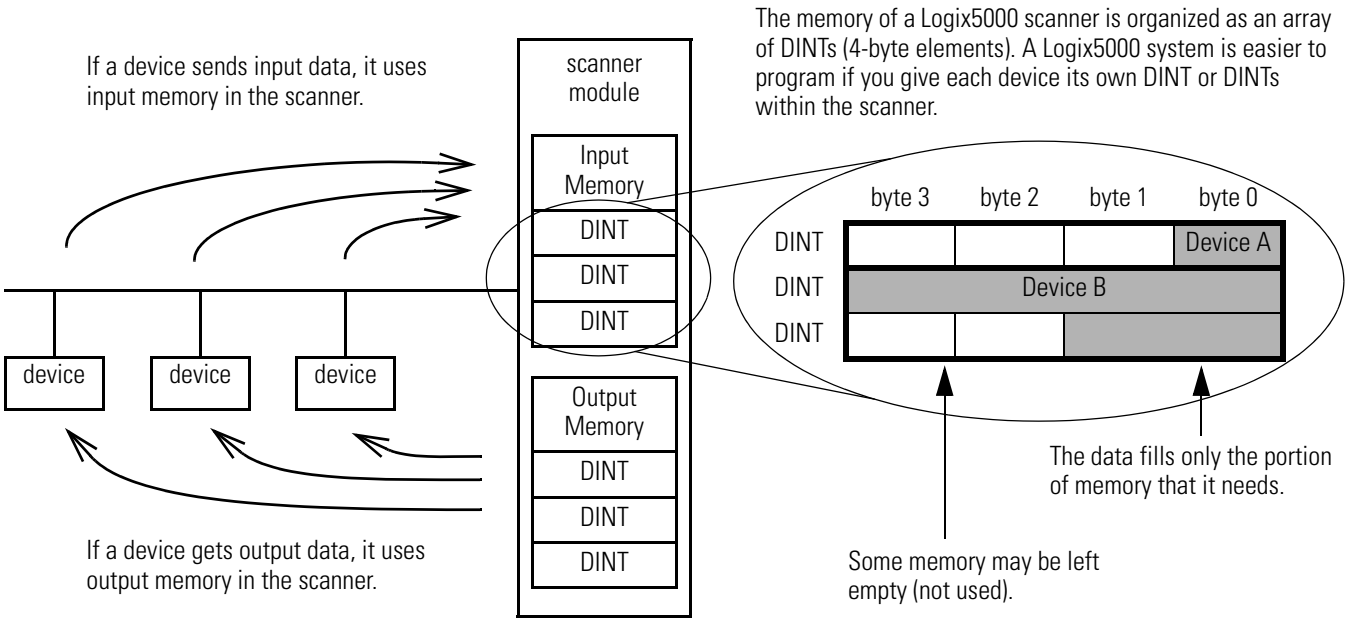
To set the baud rate for the network:

1. Connect the network interface to the network and set its baud rate.
2. Connect the scanner to the network and set its baud rate.
3. For each device that has *only* fixed baud rates (*no* autobaud), set the baud rate and connect it to the network.
4. Connect the remaining devices to the network and enable autobaud for each of them.

If a device:	Then:
has a switch to enable autobaud	A. Set the switch to autobaud. B. Connect the device to the network.
does not have a switch to enable autobaud	A. Connect the device to the network. B. Use RSNetWorx software to enable autobaud.

Calculate Scanner Memory Requirements

A Logix5000 scanner has fixed sections of memory for the input and output data of your network. Each device on your network requires either some input or output memory of the scanner. Some devices both send and receive data, so they need both input and output memory.



To make sure your network is within limits, calculate the amount of input and output memory that the scanner needs. This information will also be very useful when you configure the scanner.

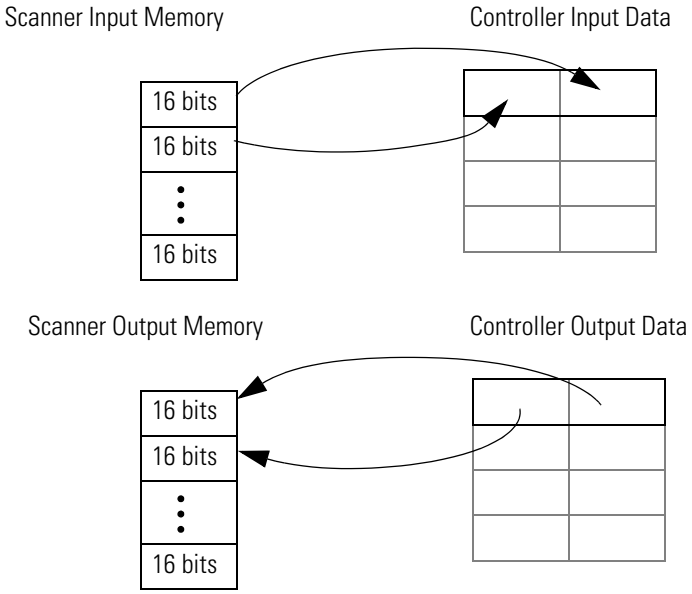
Check the I/O Limits of the Scanner

Once you tally the input and output data for your network, make sure it is within the limits of the scanner. If they exceed the limits, use multiple scanners.

Scanner	Maximum input data (DINTs)	Maximum output data (DINTs)
1756-DNB	124	123
1769-SDN	90	90
1784-PCIDS	124	123
1788-CN2DN	124	123
1788-EN2DN	124	123
1788-DNBO	124	123

If You Are Using a SoftLogix5800 Controller

The 1784-PCIDS scanner organizes its input and output memory in 16-bit increments. When you access the data in the controller, the data is packed into 32-bit increments (DINTs).



A Logix5000 system is easier to program if you give each device its own DINT or DINTs within the controller. To accomplish this with a PCIDS scanner:

- Allocate memory in 4-byte increments.
- This may result in some 16-bit words being left unused.

Assign an Address to Each Device

To communicate on the DeviceNet network, each device requires its own address. In general, a device can use any address between 0 to 63. However, we *recommend* that you follow these guidelines:

Give this device:	This address:	Notes:
scanner	0	If you have multiple scanners, give them the lowest addresses is sequence (0, 1…).
any device on your network except the *scanner*	1 to 61	• Give the lower addresses to devices with 15 bytes or more of input or output data. • Gaps between addresses are OK and have *no* effect on system performance. If you are uncertain of the final lay-out of your system, leave gaps between addresses. This gives you some flexibility as you develop your system.
computer interface to the network	62	If you connect a computer directly to the DeviceNet network, use address 62 for the computer. • Many computer interface devices use this address as their default. • Devices such as a 1770-KFD or 1784-PCD connect a computer directly to a DeviceNet network.
no device	63	Always leave address 63 open. Out of the box, most DeviceNet devices are preset for address 63. • Some devices have no switches or pushbutton to set the address. They require software such as RSNetWorx for DeviceNet software to change the address. This means that you must first place it on the network at its preset address of 63 before you can change the address. • If another device is already using address 63, there will be an address conflict and you won't be able to communicate with the newly connected device. • Leaving address 63 open makes it possible to configure a new device. • The auto-address recovery feature also requires address 63 to be open.

Here's an example:

1. Give address 0 to the scanner.
2. Give the lower addresses to devices with 15 bytes or more of input or output data.
3. Gaps in addresses are OK.

Device	Address	Input Size of Device (bytes)	Input Memory in Scanner (DINTs)	Output Size of Device (bytes)	Output Memory in Scanner (DINTs)
scanner	0	n/a	n/a	n/a	n/a
PanelView terminal	3	128	32	128	32
<empty>			2		2
I/O adapter w/ modules	5	9	3	5	2
<empty>			2		2
drive	7	4	1	4	1
<empty>			2		2
photoeye	9	1	1	0	0
computer interface	62	n/a	n/a	n/a	n/a
	63				

4. Give address 62 to the computer interface device.
5. Leave address 63 open.

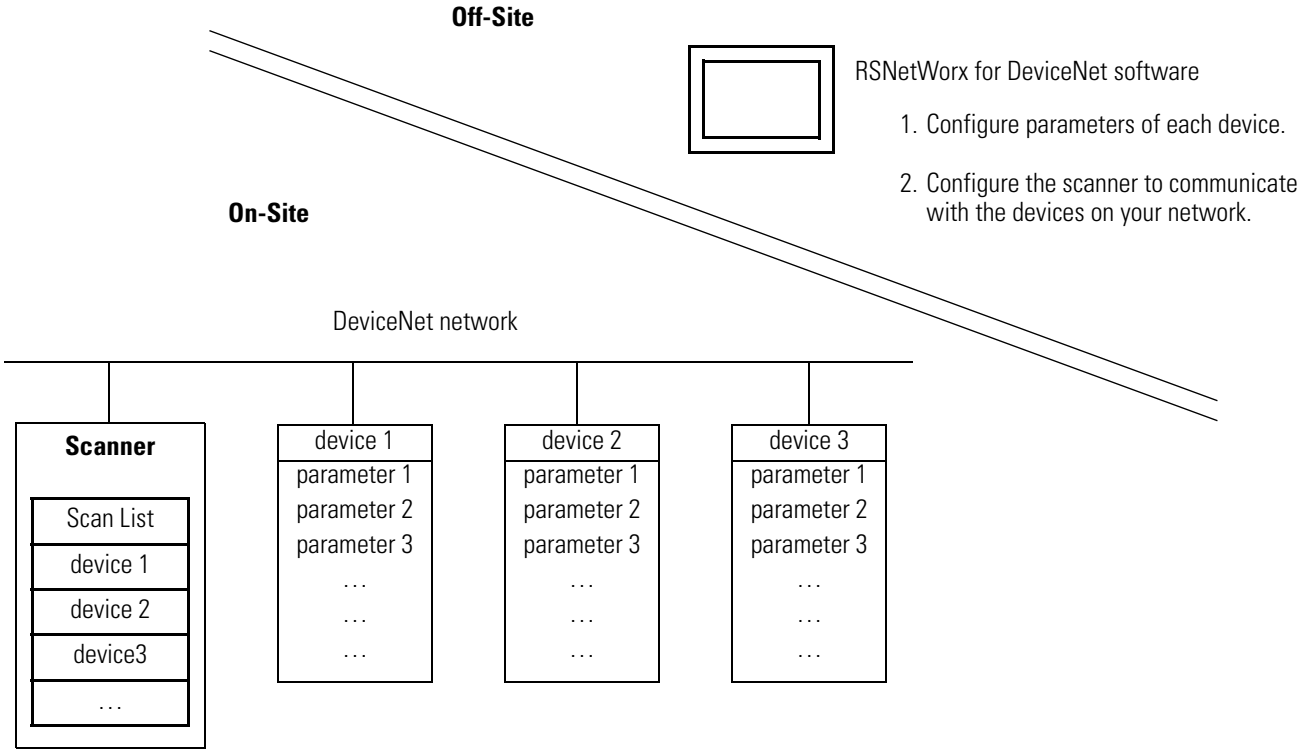
Configure Your Network Offline

How to Use This Chapter

To configure your DeviceNet network, you have the following options:

If:	Then configure your network:	See:
Any of the following conditions apply: • The network and devices are *not yet* installed. • You *do not* have access to the network. (I.e., You are off-site.) • You prefer to do most of the configuration before you get on-site with the network.	offline	This chapter
Both of the following conditions apply: • The network and devices are *already* installed. • You have access to the network. (I.e., You are on-site.)	online	Chapter 6

Offline configuration lets you do most of the DeviceNet configuration tasks before you connect to the network.



To configure a DeviceNet network while offline:

Before You Begin

Before you configure the network, make sure you have a list of the devices that you are putting on your network and the address for each of them.

For example:

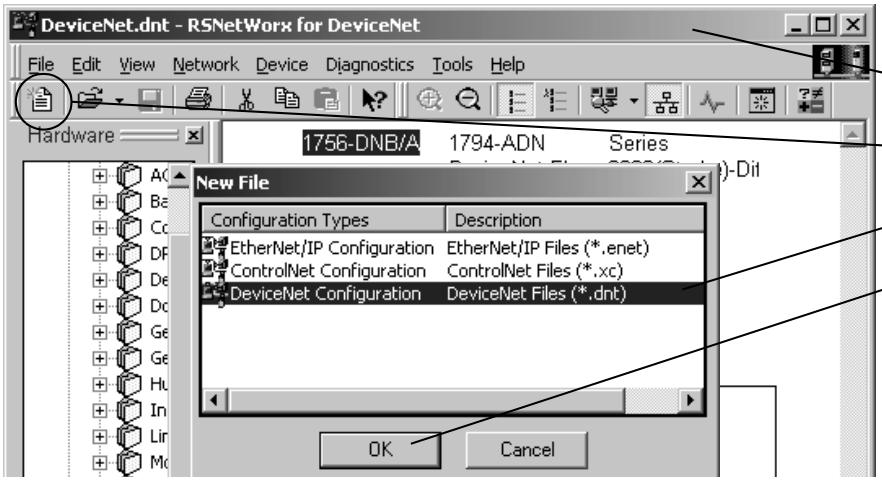
Device	Address	Input Size of Device (bytes)	Input Memory in Scanner (DINTs)	Output Size of Device (bytes)	Output Memory in Scanner (DINTs)
scanner	0	n/a	n/a	n/a	n/a
PanelView terminal	3	128	32	128	32
<empty>			2		2
I/O adapter w/ modules	5	9	3	5	2
<empty>			2		2
drive	7	4	1	4	1
<empty>			2		2
photoeye	9	1	1	0	0
computer interface	62	n/a	n/a	n/a	n/a
	63				
	Total		43		41

Create a File for the Network

RSNetWorx software stores information about the configuration of each device in a file on your computer.

Step:	See page:
❑ Create a DeviceNet Configuration File	2-3
❑ Give the File a Descriptive Name	2-3

Create a DeviceNet Configuration File



1. Start RSNetWorx software.
2. Create a file.
3. Select *DeviceNet Configuration*.
4. Choose OK.

Give the File a Descriptive Name

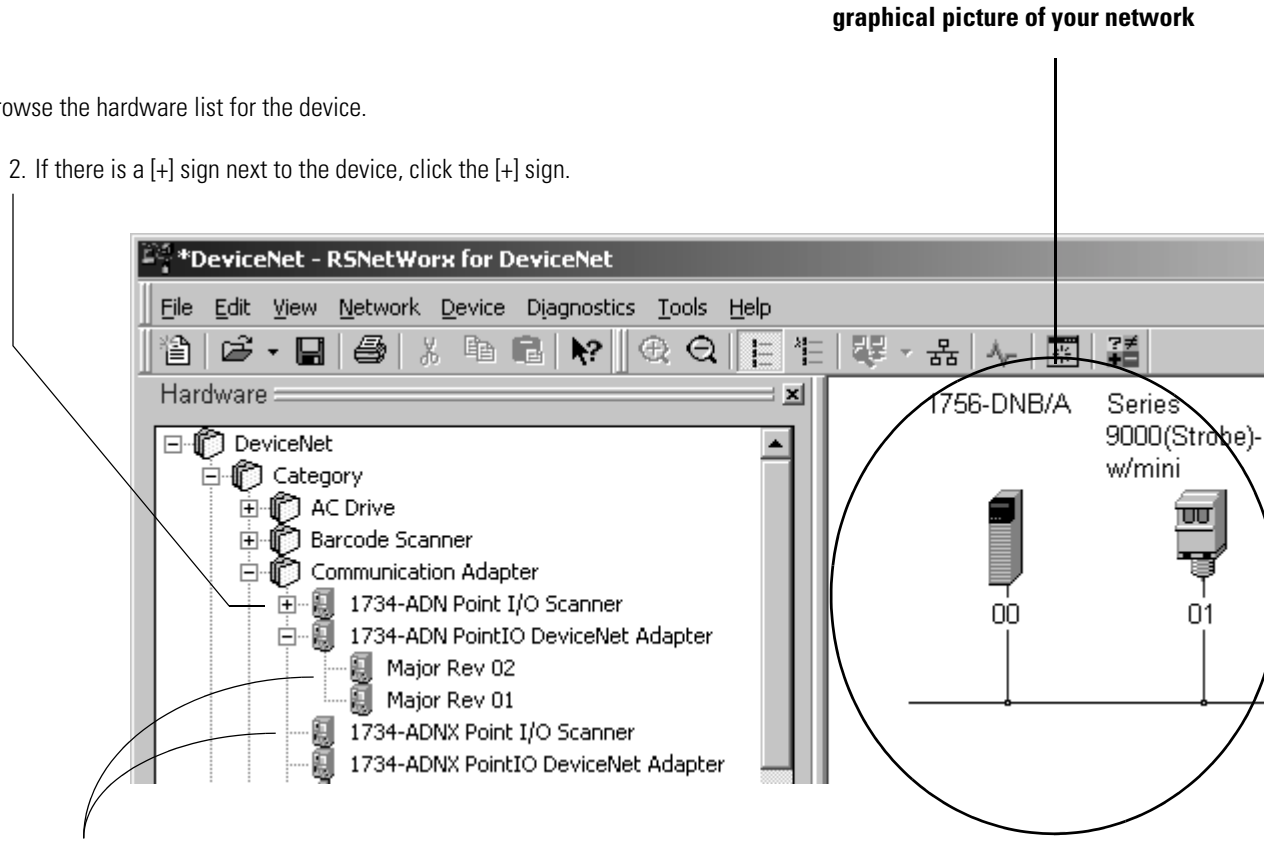
Since the file stores the configuration of the network, give it a name that identifies this specific DeviceNet network.

Save the file.

As you work in RSNetWorx software, periodically save your changes to the file for the network.

Draw Your Network

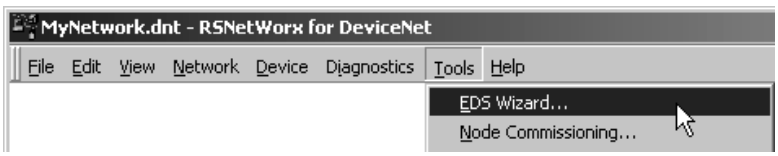
To configure a DeviceNet network, you use RSNetWorx software to build a graphical picture of your network. To build a graphical picture of your network, complete the following steps for each of your devices:



If Your Device Is Not in the Hardware List…

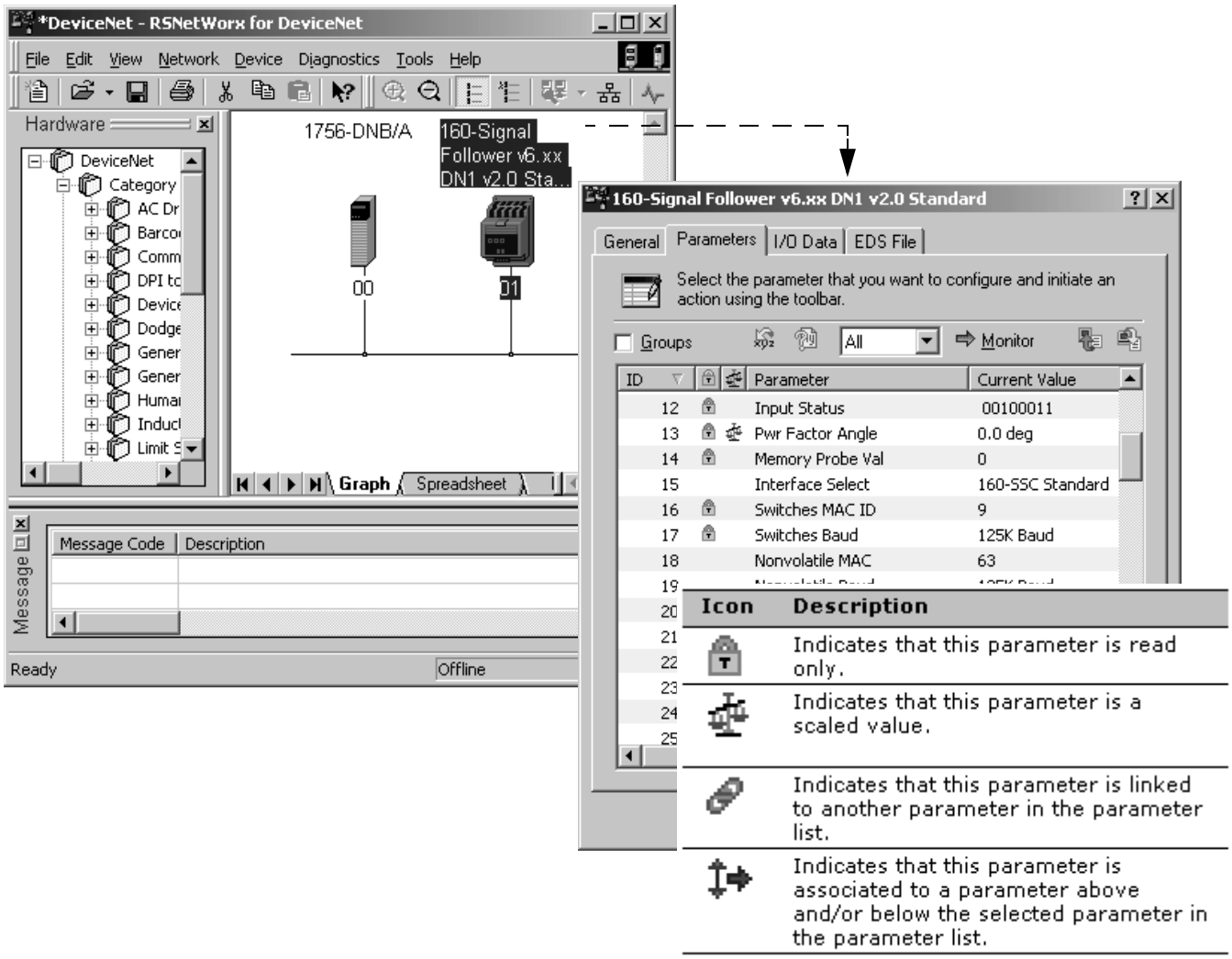
If the hardware list does *not* show a device, then RSNetWorx requires the EDS file for the device:

1. To see if an EDS file is available, go to www.ab.com/networks/eds/
2. Use the EDS wizard of RSNetWorx software to register the file.



Configure Each Device

Typically, a DeviceNet device has a set of parameters that define the behavior of the device.

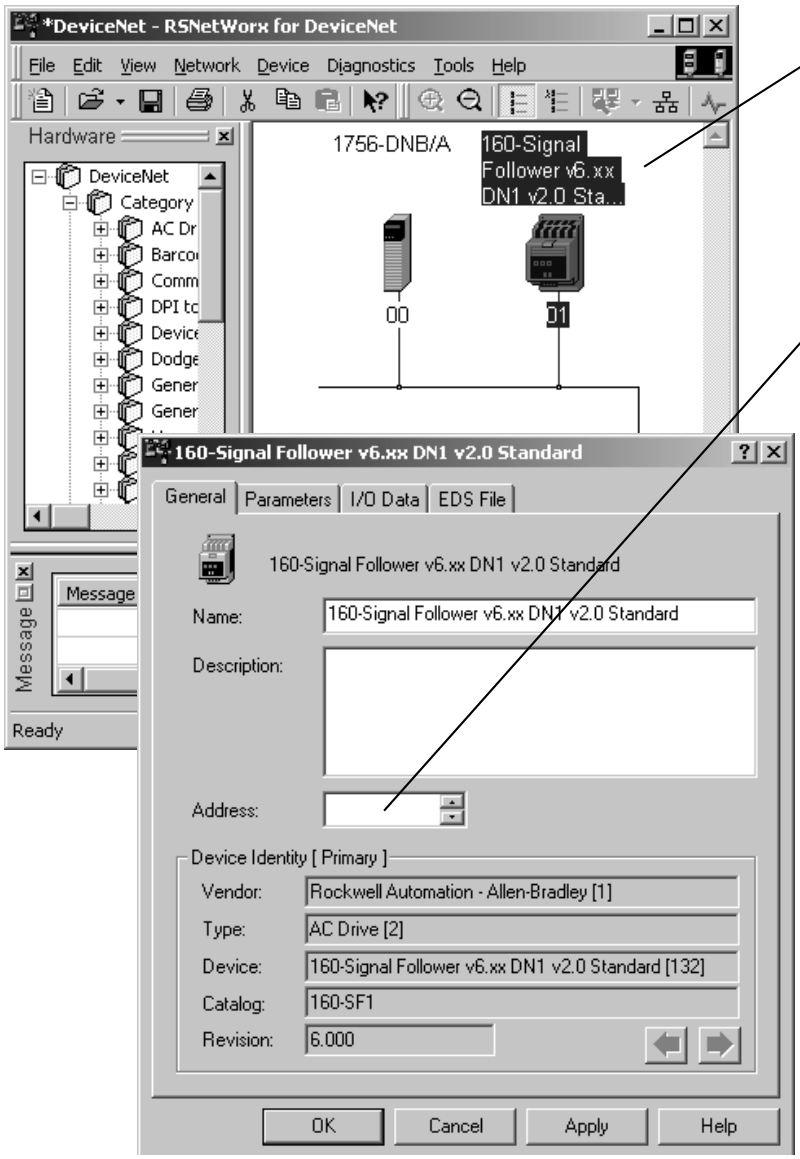


To configure a device offline:

Step:	See page:
❑ Specify the Address of the Device	2-6
❑ Configure the Parameters of the Device	2-7

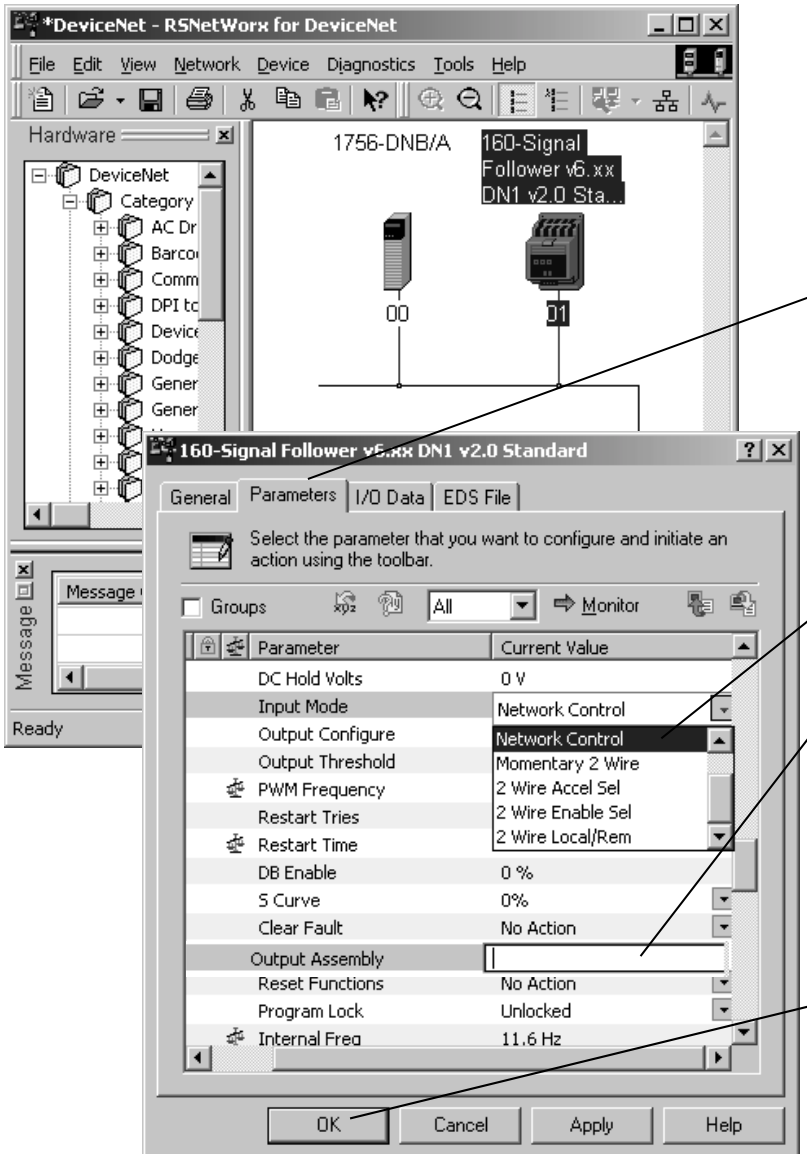
Specify the Address of the Device

When you are *offline*, the address on the diagram identifies a device. It *does not* set the device to that address. In chapter 5, you will set the address of each device.



1. Double-click the device.
2. Type or select the DeviceNet address for the device.

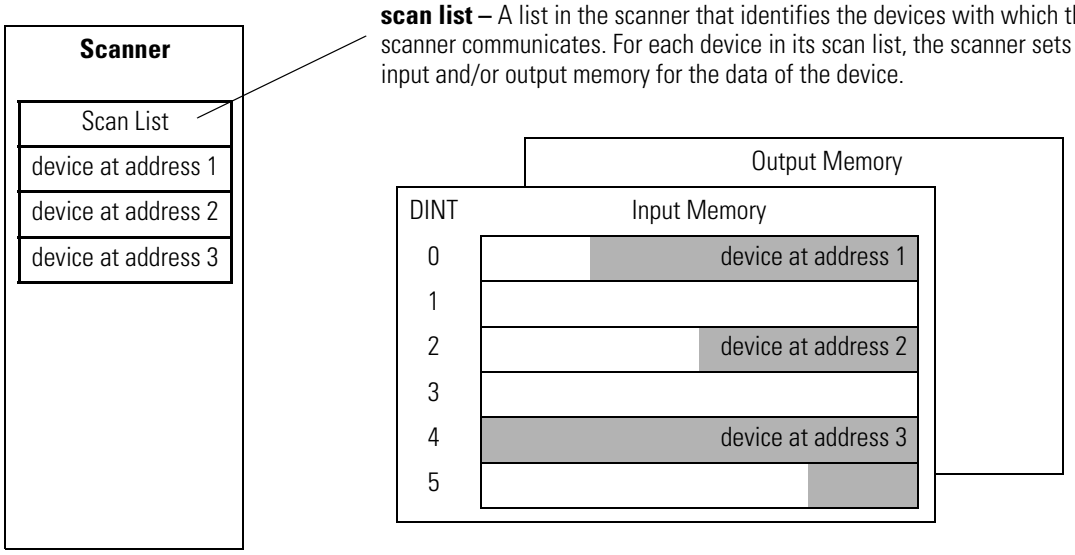
Configure the Parameters of the Device



1. Click the *Parameters* tab.
2. Set a parameter to the required value:
   - Select a new value.
   – or –
   - Click, type a new value, and press [Enter].
3. Close the dialog box.

Configure the Scanner

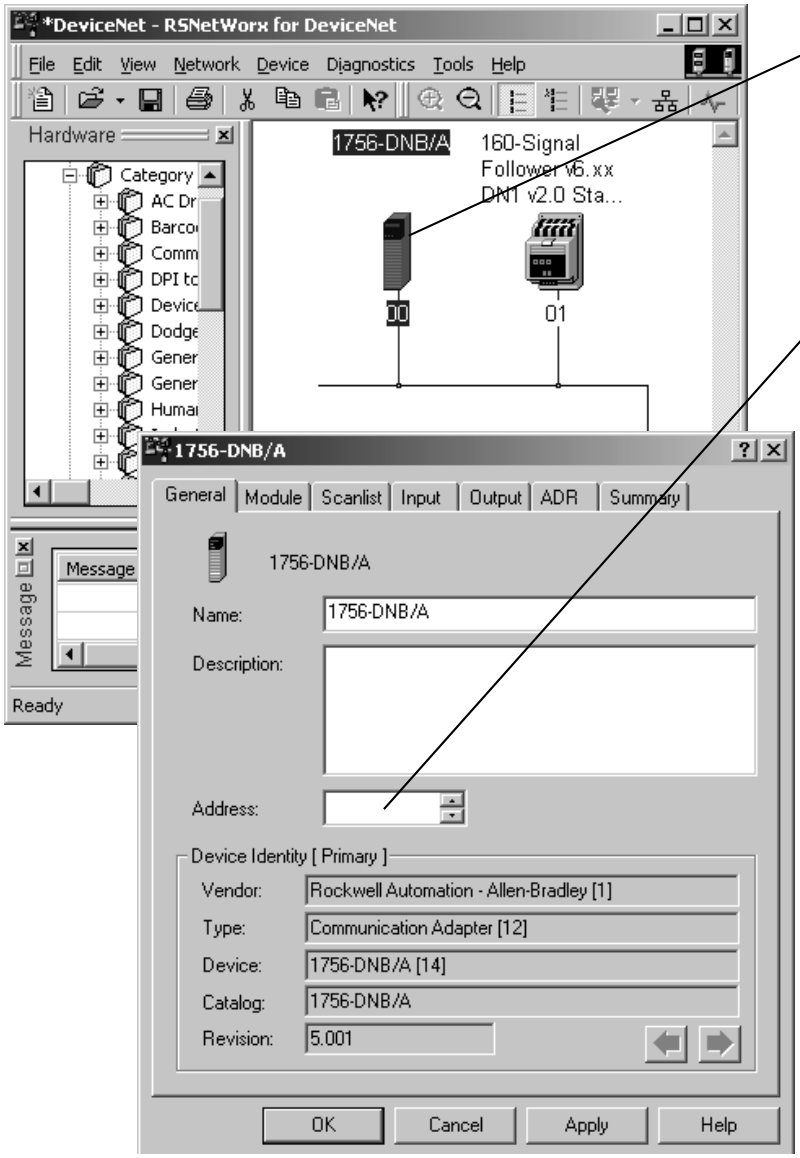
To configure the scanner to communicate with the devices on your network, you set up a scan list in the scanner. Then you define memory locations for the data of each device.



To configure the scanner offline:

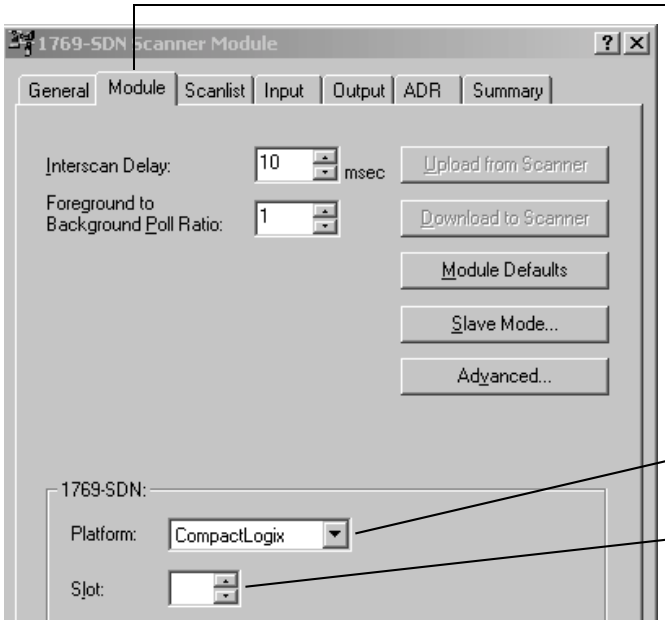
Step:	See page:
❑ Specify the Address of the Scanner	2-9
❑ Define the Properties of the Scanner	2-10
❑ Set the Alignment Option	2-11
❑ Clear or Set the Automap on Add Check Box	2-12
❑ Build the Scan List	2-13
❑ Manually Assign Each Device to a Memory Location	2-14
❑ Close the Configuration of the Scanner	2-15

Specify the Address of the Scanner



1. Double-click the scanner.
2. Type or select the DeviceNet address for the scanner.

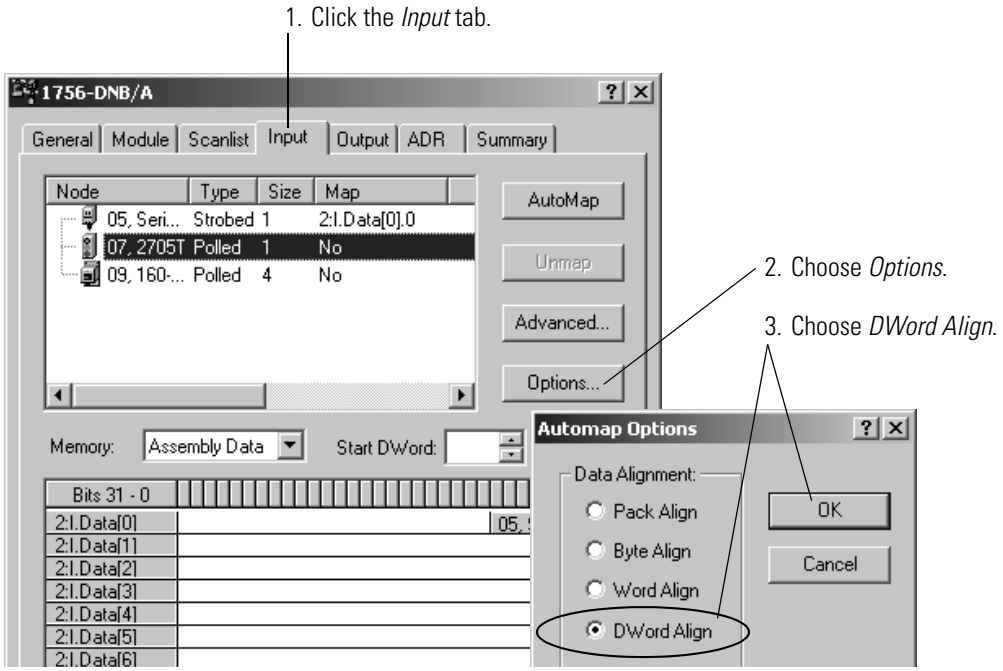
Define the Properties of the Scanner

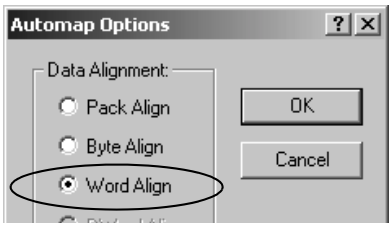


1. Click the *Module* tab
2. If this is a CompactLogix scanner (1769-SDN), choose *CompactLogix*.
3. If the scanner uses a slot number, type its slot number.

Set the Alignment Option

TIP The alignment option you choose applies to both the input and output maps.



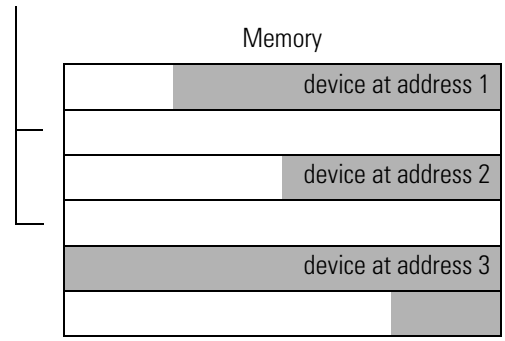
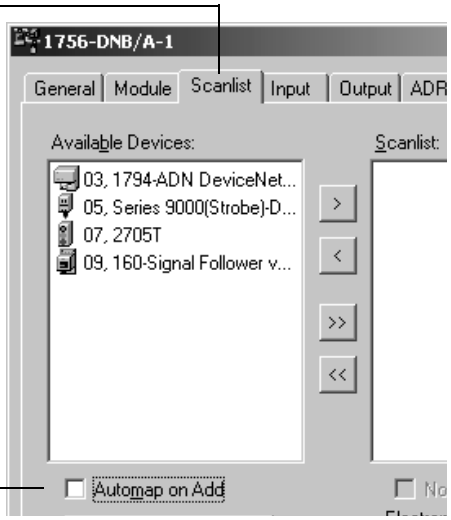
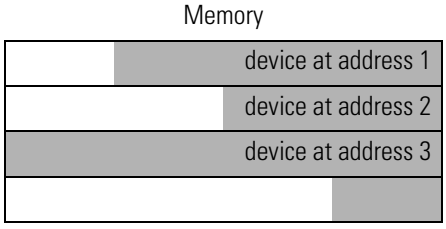
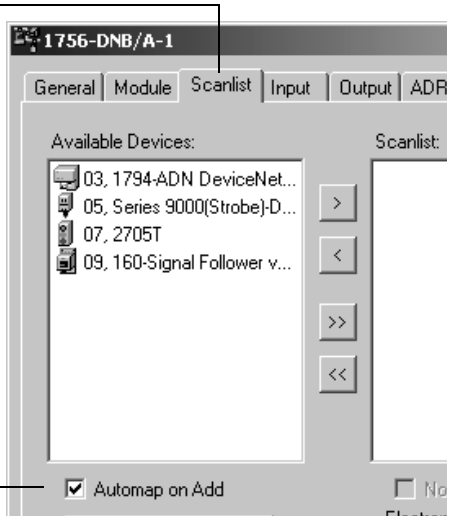


If You Have a SoftLogix5800 Controller

The SoftLogix5800 scanner 1784-PCIDS organizes its input and output memory in 16-bit words. For that scanner, choose *Word Align*.

Clear or Set the Automap on Add Check Box

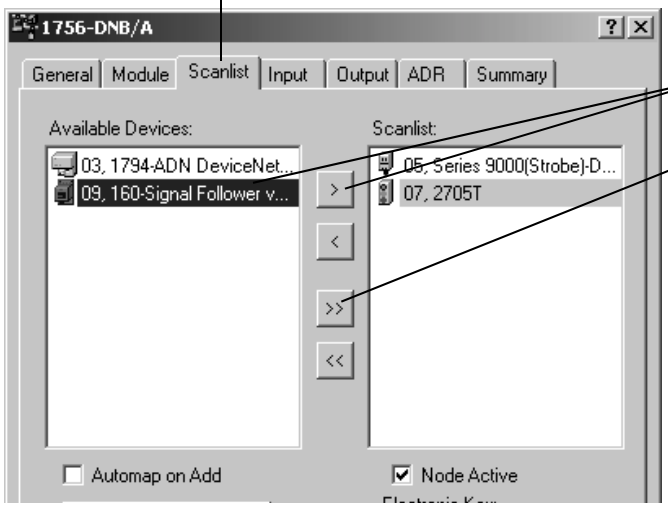
As an option, RSNetWorx software can automatically assign the memory location for each device. Depending on how you want to organize the memory, you may or may not want to use this option.

If you want to:	Then:
leave gaps between devices 	1. Click the *Scanlist* tab 2. Clear (uncheck) the *Automap on Add* check box  After you add your devices to the scan list, manually assign the memory location for each device.
place devices in sequential DINTs 	1. Click the *Scanlist* tab 2. Set (check) the *Automap on Add* check box.  As you add your devices to the scan list, the software automatically assigns the memory locations for each device.

Build the Scan List

1. You should be at the *Scanlist* tab

2. Add devices to the scan list.



To add:	Do this:
devices one at a time	Select a device and click the > button.
all the devices at once	Click the >> button.

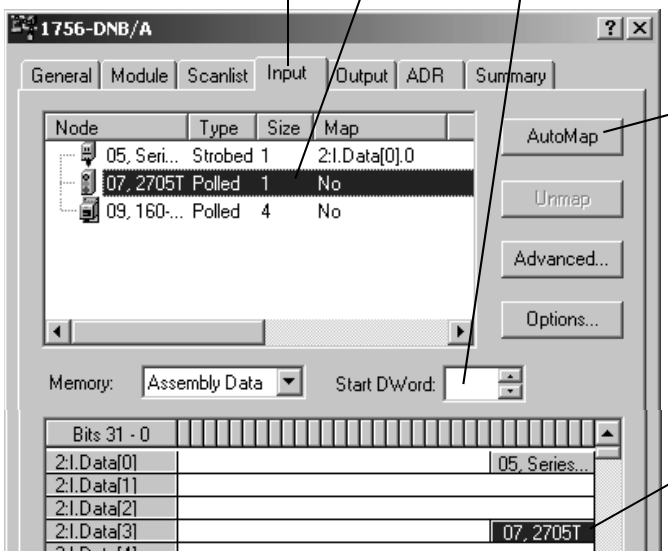
If you get the following warning for a device, see *Set the I/O Parameters of a Device* on page 11-6**.**

Manually Assign Each Device to a Memory Location

IMPORTANT If you used *Automap on Add* (page 2-12).as you built your scan list, then skip this section. Each device already has a memory location.

1. Click the *Input* tab.
2. Select the device.
3. Type the element number to which you want to assign the data. This is the starting point for the data. Larger data sizes wrap to several elements.

   For example, to start the data in …Data[3], type 3 in the Start DWord box.
4. Choose *AutoMap*.



An entry for the device shows up in the input array.

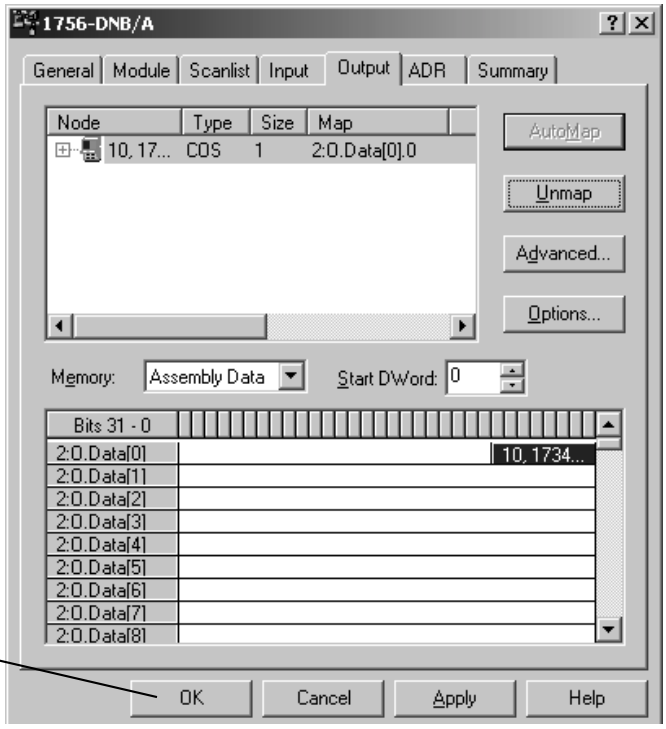
5. Click the Output tab and repeat steps 2 - 4.

Sometimes, a specific input or output value may end up as the upper bytes of a DINT in the scanner.

Instance 70 Data Format (Basic Speed Control Input Assembly)								
Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0						Running1		Faulted
1	Speed Actual RPM (Low Byte)							
2	Speed Actual RPM (High Byte)							
3								

To make your programming easier, use advanced mapping to re-map the value to its own memory location. For more information, see *Give a Value Its Own Memory Location* on page A-1.

Close the Configuration of the Scanner



Close the dialog box.

Save the Network File

After you configure each device on your network, including the scanner, save the file.

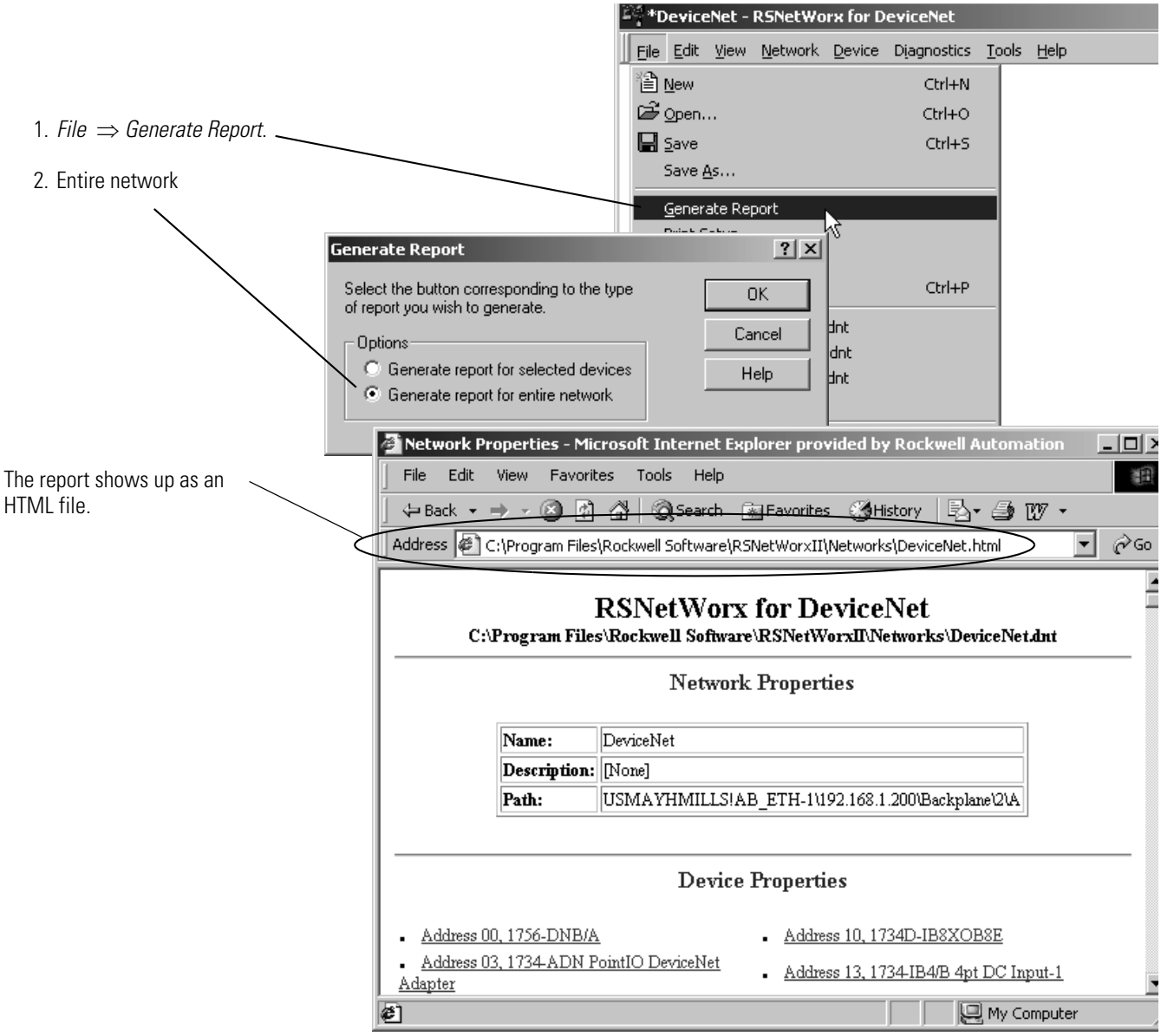
Save the file.

Generate an RSNetWorx Report

An RSNetWorx report shows the following:

- devices on your network
- memory addresses of those devices in the scanner
- configuration of each device

The report is a very useful reference when you program your system.



Download the Configuration to Network

After you configure the network offline, you must download the configuration to the network. Do this after the network and devices are installed and you have access to the network.

Step:	See page:
❑ Before You Download the Configuration	2-17
❑ Open the Configuration File for the Network	2-17
❑ Go Online to the Network	2-18
❑ Download the Configuration to the Network	2-19

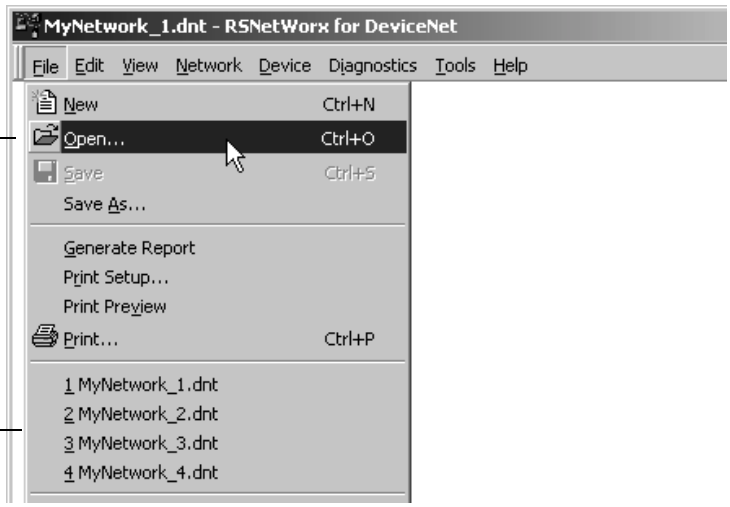
Before You Download the Configuration

Before you download the configuration, your computer must be able to communicate with each device on your DeviceNet network. Make sure that you have completed the following steps:

Step:	See:
☑ Connect a Computer to the System	Chapter 3
☑ Connect Each Device to the Network	Chapter 5

Open the Configuration File for the Network

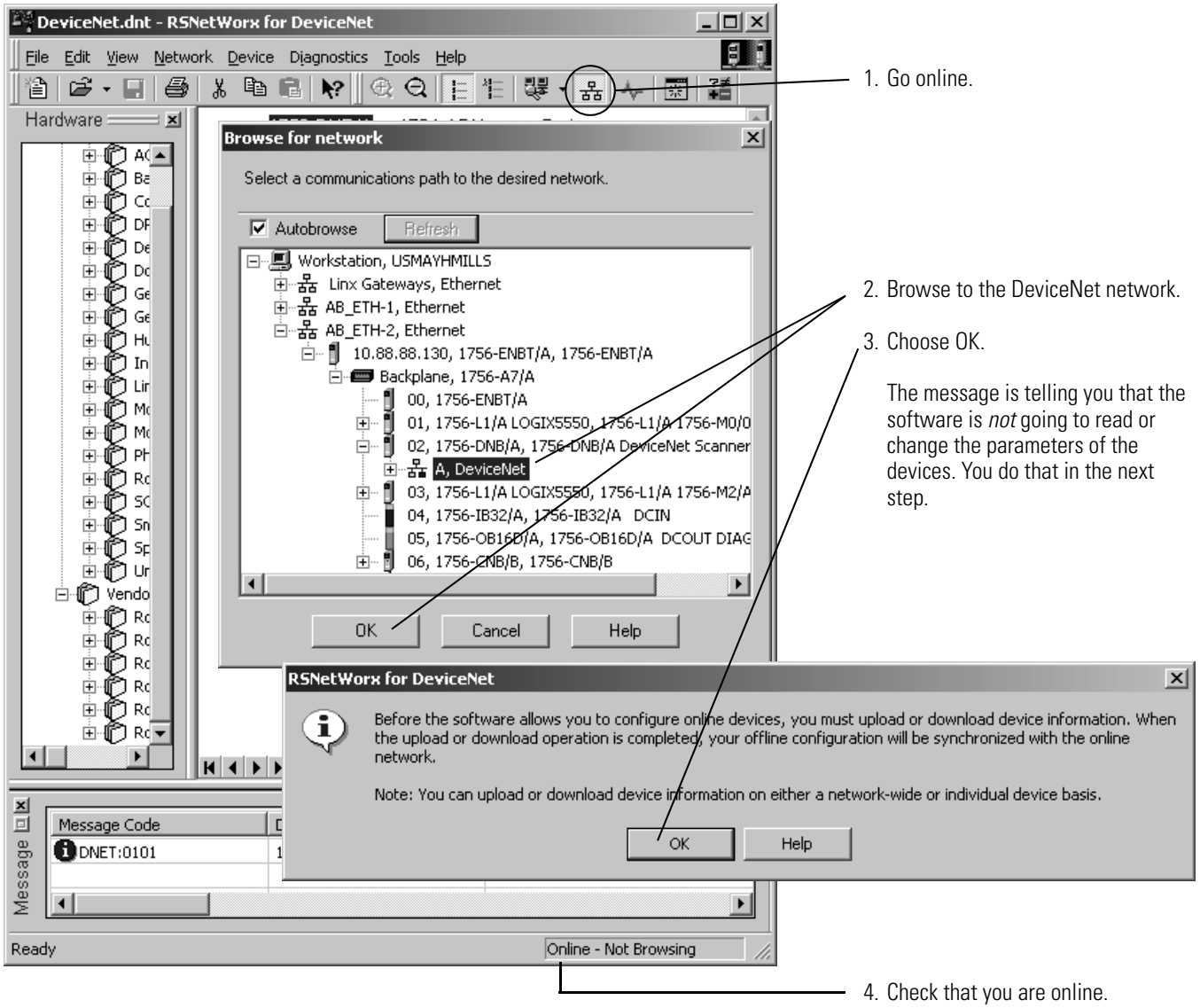
1. Start RSNetWorx software.
2. Open the dnt file for the network.



Go Online to the Network

When you go online to a DeviceNet network, RSNetWorx software looks at the network (browses) one time and shows you the devices on the network.

- It *does not* read (upload) or change (download) the parameters of any of the devices.
- The picture you see remains static. It *does not* show any changes since the last browse.



Download the Configuration to the Network

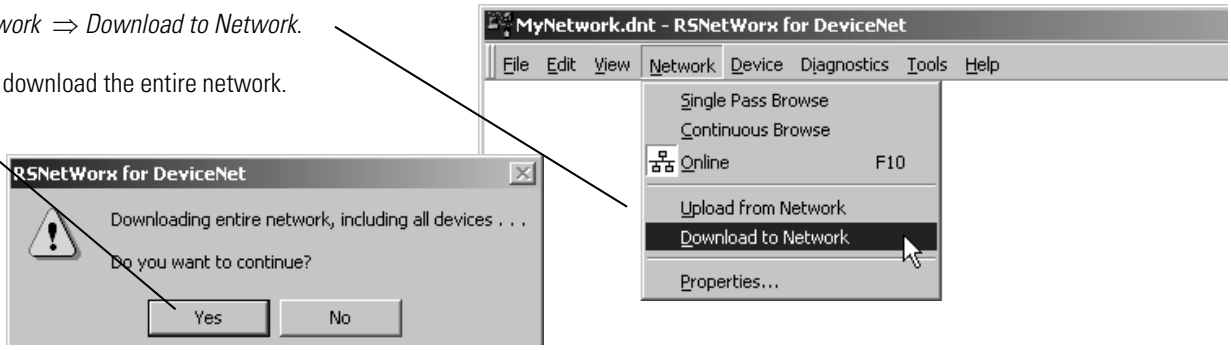
IMPORTANT Make sure the scanner is in idle mode. To put the scanner in idle mode, either:

- Turn off the …O.CommandRegister.Run bit of the scanner.

  - *or* -

- Place the controller in program/remote program mode.

1. *Network* ⇒ *Download to Network.*
2. Yes, download the entire network.



Notes:

Connect a Computer to the System

How to Use This Chapter

This chapter shows how to connect a computer to your system so you can:

- configure the devices on the network
- configure network parameters
- upload, download, monitor, and program projects for Logix5000 controllers

Some networks let you browse (bridge) to other networks in your system. This lets you connect to one network and access devices or controllers on other networks.

To access your system, choose a network to which to connect and configure a driver for the network.

Connect a Computer to a Network

To access a network, either:

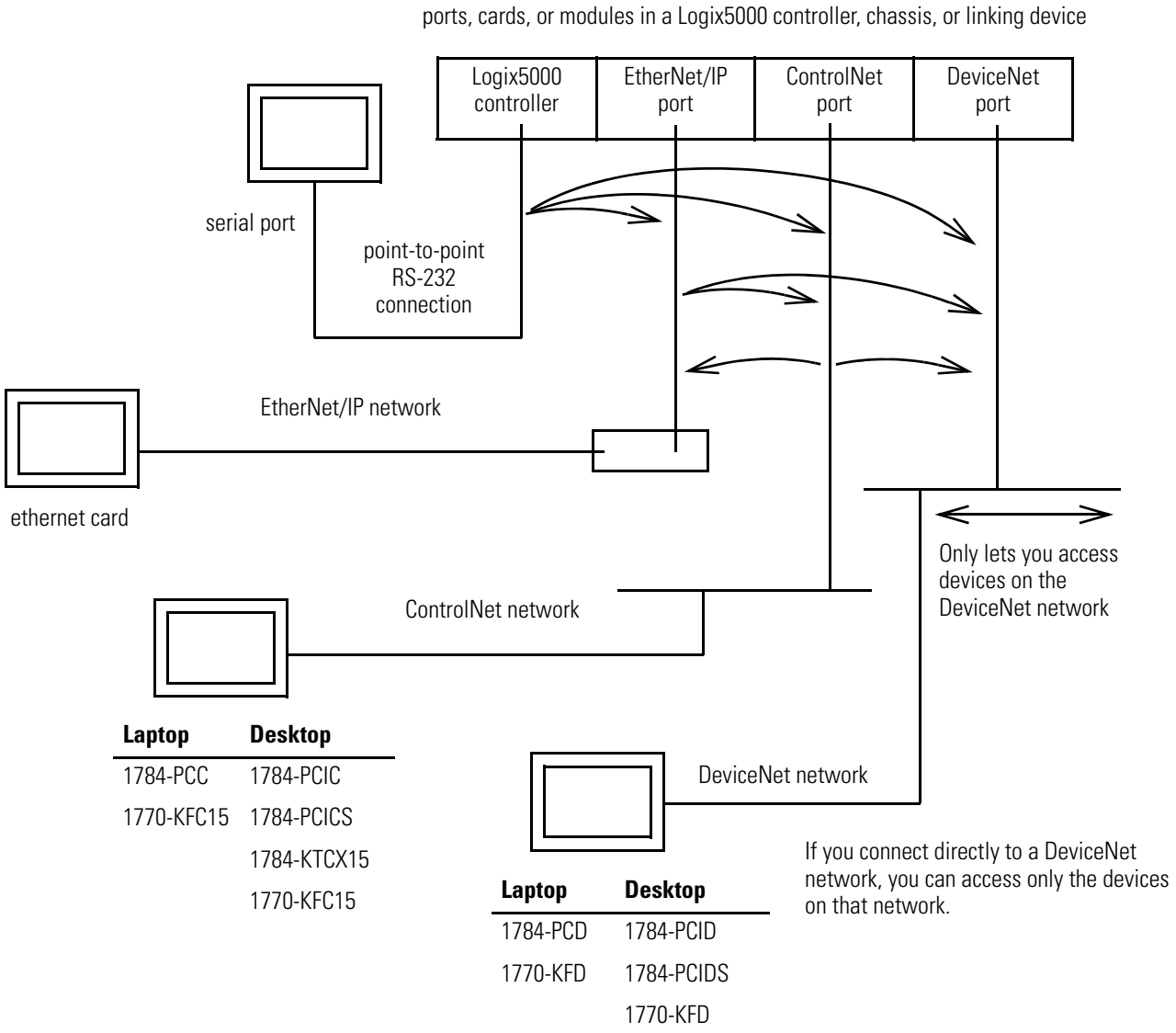
- connect directly to the network
- connect to a different network and browse (bridge) to the desired network. This requires *no* additional programming.

IMPORTANT

To use RSNetWorx software to configure and schedule a ControlNet network, *either*:

- connect to an EtherNet/IP network and bridge to the ControlNet network
- use a 1784-PCC interface device to connect directly to the ControlNet network

The following diagram shows your options:



Once you choose a network to which to connect:

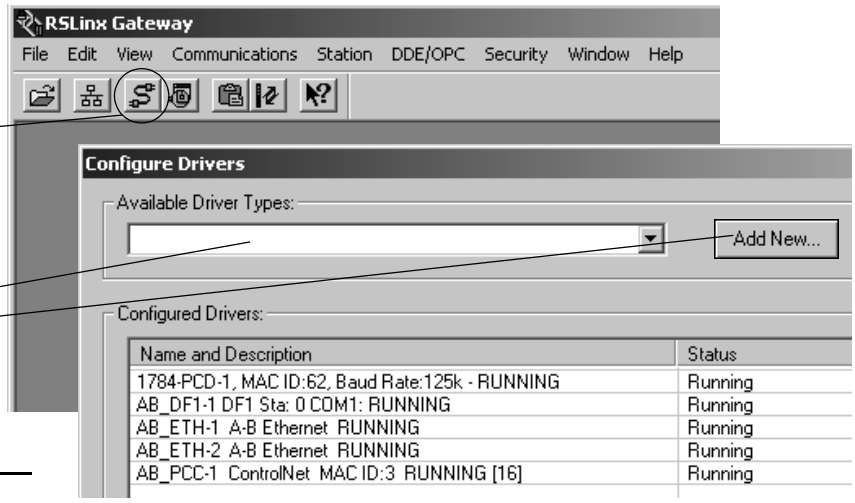
- Install the communication card, if required.
- Determine any network parameters for the computer, such as a network address.
- Connect the computer to the network with the correct cable.

Configure a Driver for a Network

To communicate over a specific network, configure a driver for the network.

Add the Driver

1. Start RSLinx software.
2. Click the *Configure Driver* button.
3. Add the driver:

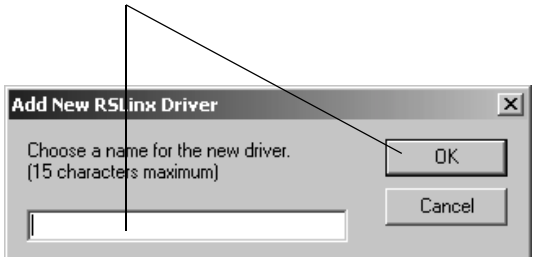


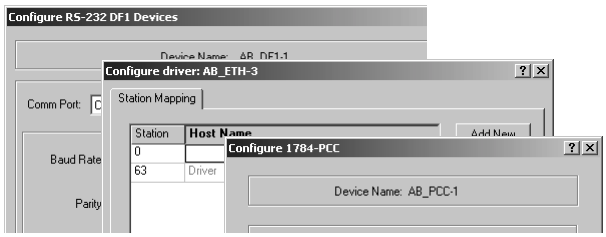
For this network:	Select this driver:
RS-232	RS-232 DF1 Devices
ControlNet™	driver that matches your card.
EtherNet/IP	Ethernet devices
DeviceNet™	DeviceNet Drivers…

4. Configure the driver.

descriptive name for the network (driver)

configuration (see pages 3-4 to 3-5 for help with specific drivers)





RS-232 DF1 Devices

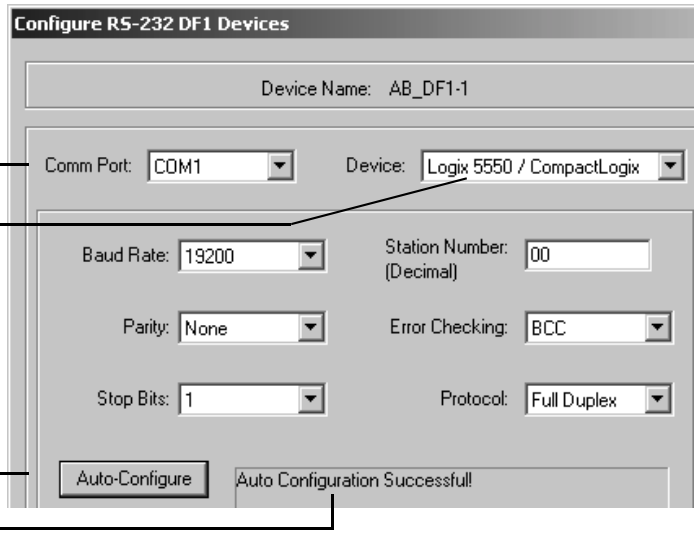
Important: Make sure *no* other driver is configured for the COM port to which you connect the serial cable.

1. Choose the following:

COM port that you are using.

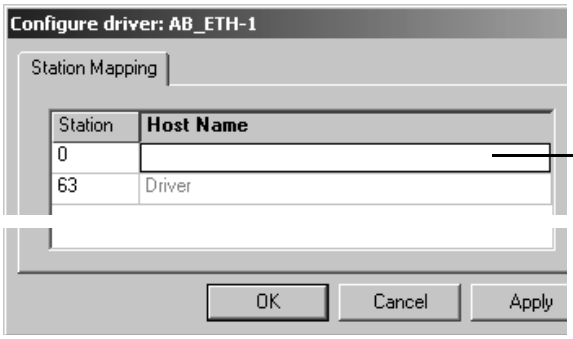
Logix 5550/CompactLogix.

Auto-Configure



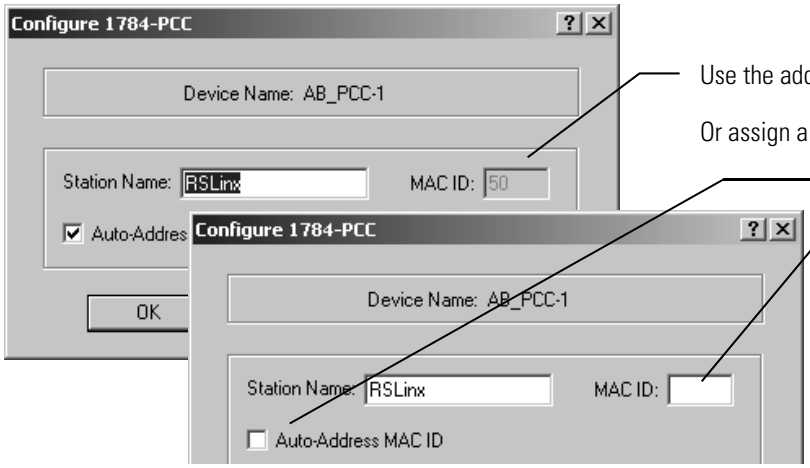
5. Wait for the auto-configuration to finish.

Ethernet Devices



Enter the IP address of the controller or communication module.

1784-PCC



Use the address that the software picks.

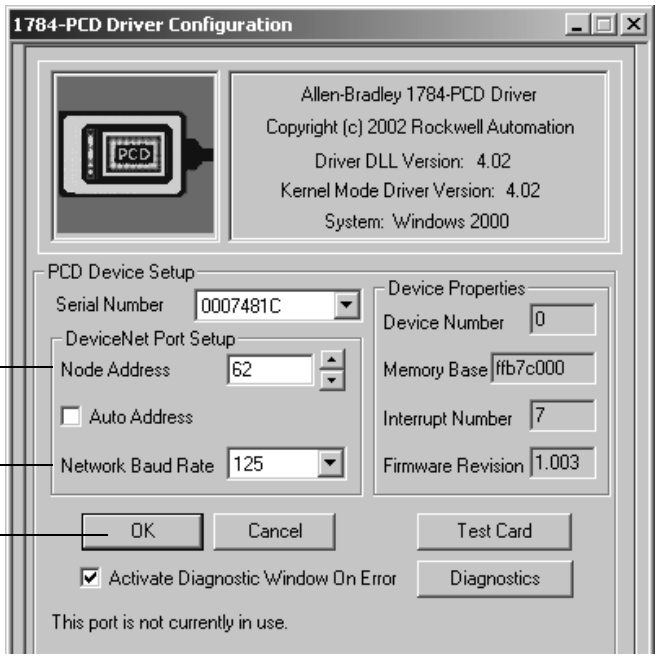
Or assign a specific address:

A. Clear this check box.

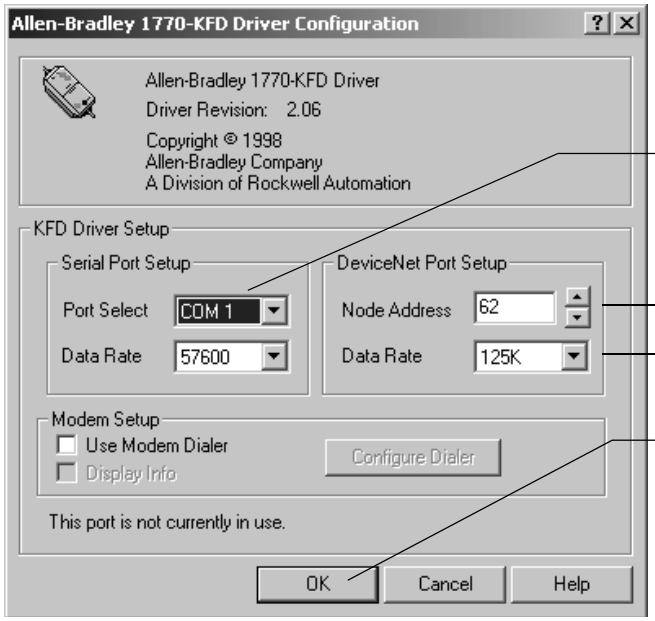
B. Enter the address that you to use.

1784-PCD

1. Use the default address of 62, if it is unused.
2. Select the baud rate for the network.
3. OK.



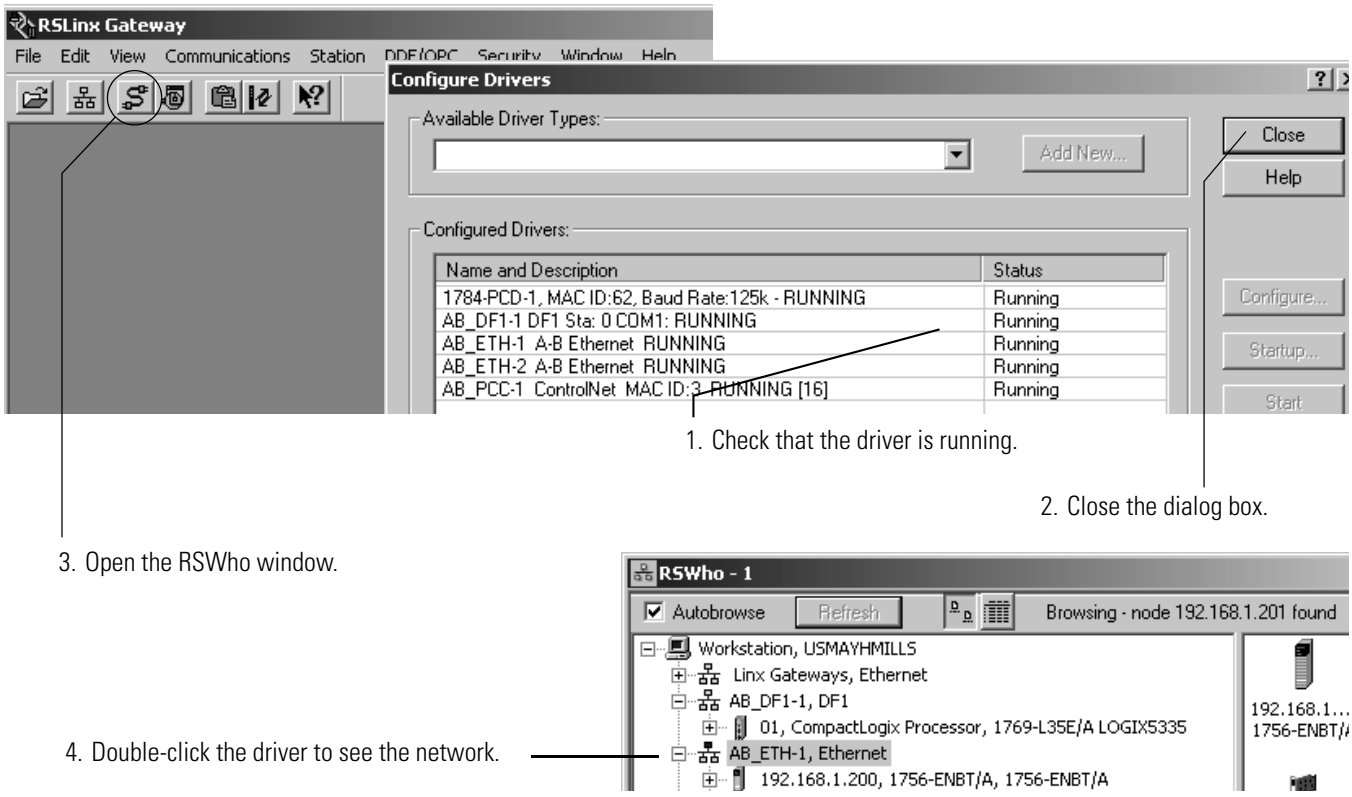
1770-KFD



Important: Make sure *no* other driver is configured for the COM port to which you connect the serial cable.

1. Select the COM port to which you connected the 1770-KFD device.
2. Use the default address of 62, if it is unused.
3. Select the baud rate for the network.
4. OK.

Make Sure the Driver Works



Automatically Configure a DeviceNet Network

How To Use This Chapter

Before you use this chapter:

☑	Connect your computer to the system. See chapter 4.

This chapter provides a quick method for configuring a DeviceNet network. It uses the AutoScan feature to establish communication between the controller and your devices with minimal steps.

To use the AutoScan feature to configure your network:

Determine If You Can Use AutoScan

To use this chapter, make sure your network meets the following requirements:

☑	Each device on your DeviceNet network (except the scanner): • sends ≤ 4 bytes of input data • gets ≤ 4 bytes of output data
☑	You have one of the following DeviceNet scanners: • ControlLogix 1756-DNB • FlexLogix 1788-DNBO
☑	Your scanner has the following firmware revision:

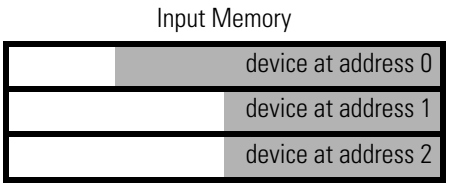
This scanner:	Requires this firmware:
ControlLogix 1756-DNB	revision 5.0 or greater
FlexLogix 1788-DNBO	revision 3.0 or greater

☑	You have RSLogix 5000 software revision 13.0 or greater.

If your network does not meet the requirements listed above, then use chapters 5 to 7 to configure your network and control your devices.

How AutoScan Effects Your Network

As you use AutoScan, keep the following in mind:

Consideration:	Description:
1. AutoScan clears the current configuration.	With AutoScan, the scanner automatically sets up communication with the devices on your DeviceNet network. When you turn on the AutoScan option, the scanner removes any previous configuration that was done to the scanner.
2. AutoScan allocates a fixed memory size for each device.	At its default setting, AutoScan allocates 1 DINT of input memory and 1 DINT of output memory for each device on the DeviceNet network. The actual data for the device fills the portion that it needs and the rest remains unused. 
3. New devices are automatically available.	While the scanner is in idle mode, AutoScan continues to establish communication with devices that you connect to the network (as long as the device uses ≤ 4 bytes of input data and ≤ 4 bytes of output data).
4. The Automatic Device Recovery (ADR) option is *not* available.	To use the Automatic Device Recovery (ADR) option of a DeviceNet scanner, you have to use RSNetWorx software to edit the configuration of the scanner. This turns off AutoScan.

Install the Node Commissioning Tool

Use this tool to set the DeviceNet address of a device that has *no* switch, pushbutton, or other mechanism for its address.

If all your devices have a switch or pushbutton for their address, then skip this step. You *do not* need the Node Commissioning tool.

To install the Node Commissioning tool:

1. Get your RSLogix 5000 software CD.
2. On the CD, find the following folder:

   `language`\Tools\Node Commissioning Tool

   where:

   `language` is the language of your software. For example, for software in English, open the ENU folder.
3. Follow the instructions in the *readmefirst* file.

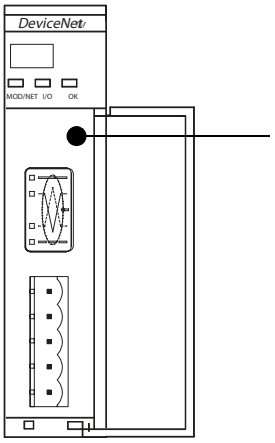
Connect Each Device to the Network

As you connect your devices to the DeviceNet network, follow these guidelines:

Step:		Details:	
❑	1. Assign an address to each device.	The following addresses are recommended but not required:	
		Give this address:	**To this device:**
		0	scanner
		1 to 61	your devices
		62	computer interface to the network, such as a 1770-KFD or 1784-PCD device
		63	Leave open. Out of the box, a DeviceNet device is preset for address 63. Leaving address 63 open lets you get a new device on the network without conflicting with another device.
❑	2. Connect the scanner and any network interface to the network.	By first connecting the scanner and/or network interface device to the network, you reduce the number of baud rate errors as you connect the rest of your devices: • Scanners and network interface devices use a fixed baud rate. • Sensors and similar DeviceNet devices use autobaud to set their baud rate. They wait for another device to communicate. Then they set their baud rate to the same baud rate as the other device. • By first placing a scanner or network interface on the network, the other device have a baud rate against which to set their baud rate. • Initially, leave the baud rate of the scanner and network interface at the default setting of 125K bits/s. If you want to change the baud rate, wait until after you establish communication with all your devices at the default setting (125K). • To set the DeviceNet address of the scanner, see *Set the Address of a Scanner* on page 4-4.	
❑	3. Connect the rest of your devices to the network one at a time.	• Out of the box, a DeviceNet device is preset for address 63. To avoid address conflicts, connect and set the devices one at a time. Otherwise the address conflicts may prevent communication with them. • If a device has a switch to set its baud rate, set the switch to autobaud, if available. Otherwise, set the device to the baud rate of the network. • After you change the address or baud rate of a device via a switch, cycle power to the device. • If a device has *no* switch or pushbutton for its address or baud rate, see *Set the Address and Baud Rate of a Device Via Software* on page 4-5. • After you set the address of a device, check its network status indicator. Typically, a solid red or flashing red indicator means an address conflict or problem with the baud rate.	

Set the Address of a Scanner

ControlLogix Scanner 1756-DNB

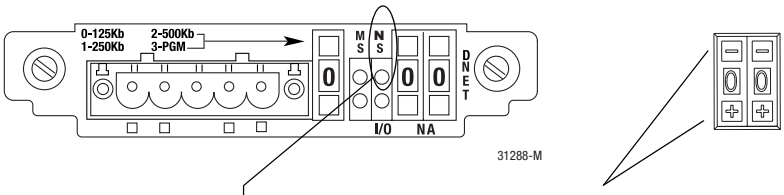


1. Connect the device to the network. (If disconnected or the network power is off, the pushbutton changes the baud rate.)
2. Turn on the power to the device.
3. Press and hold the manual configuration pushbutton until the device displays the desired address.

   When you release the button, the device resets to the new address.
4. After the device resets, check the 4-character display on the front of the module:

If:	Then the:
`A#address`	address is OK
`Duplicate Node Address`	address conflicts with another device

DriveLogix and FlexLogix Scanner 1788-DNBO

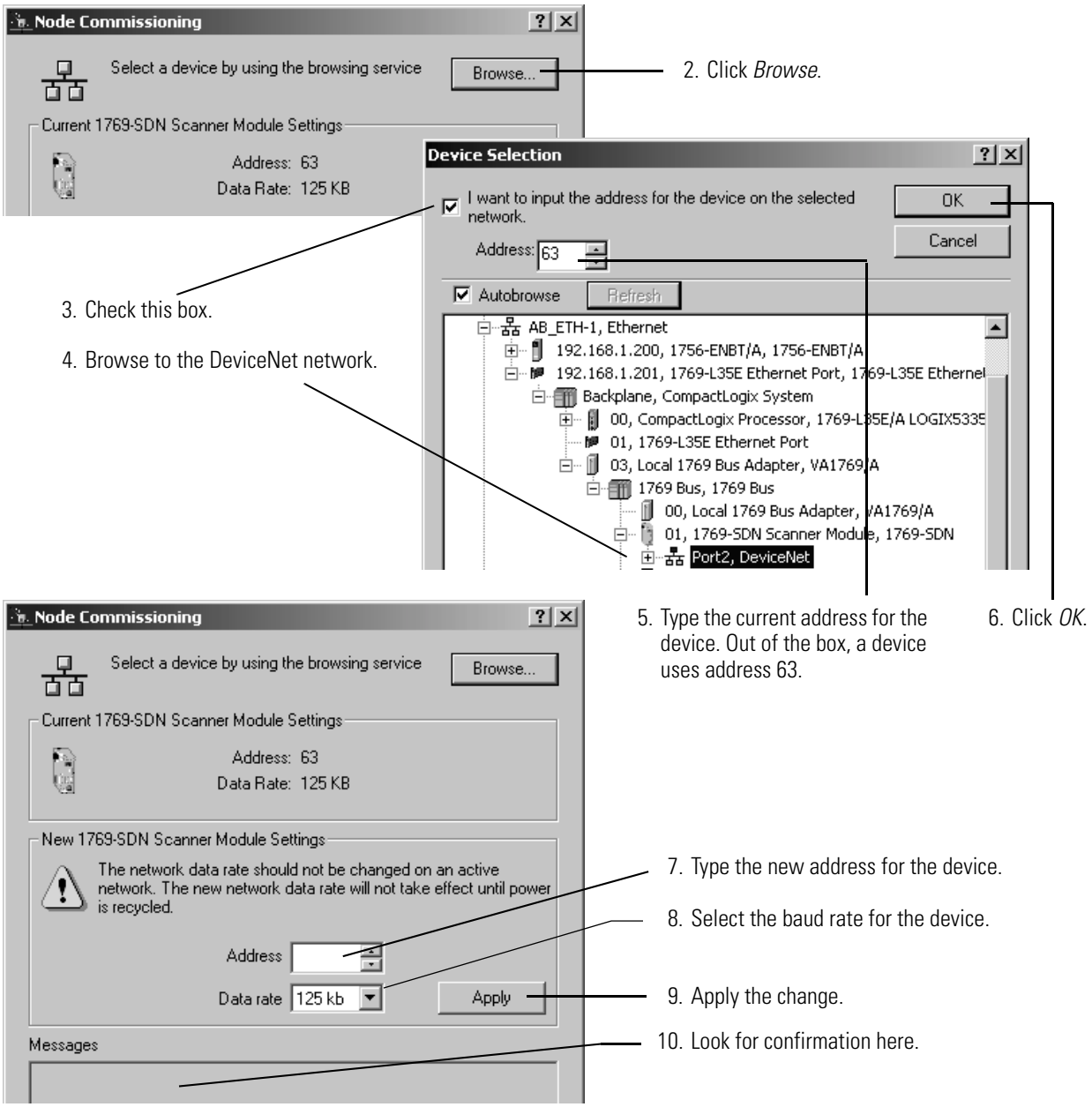


1. To change the address, press the button above or below a number.
2. Connect the device to the network.
3. Turn on power to the device.
4. Check the NS (network status) light.

If:	Then the:
green (flashing or solid)	address is OK
solid red	address and/or baud rate conflict with another device

Set the Address and Baud Rate of a Device Via Software

1. Start the Node Commissioning tool.

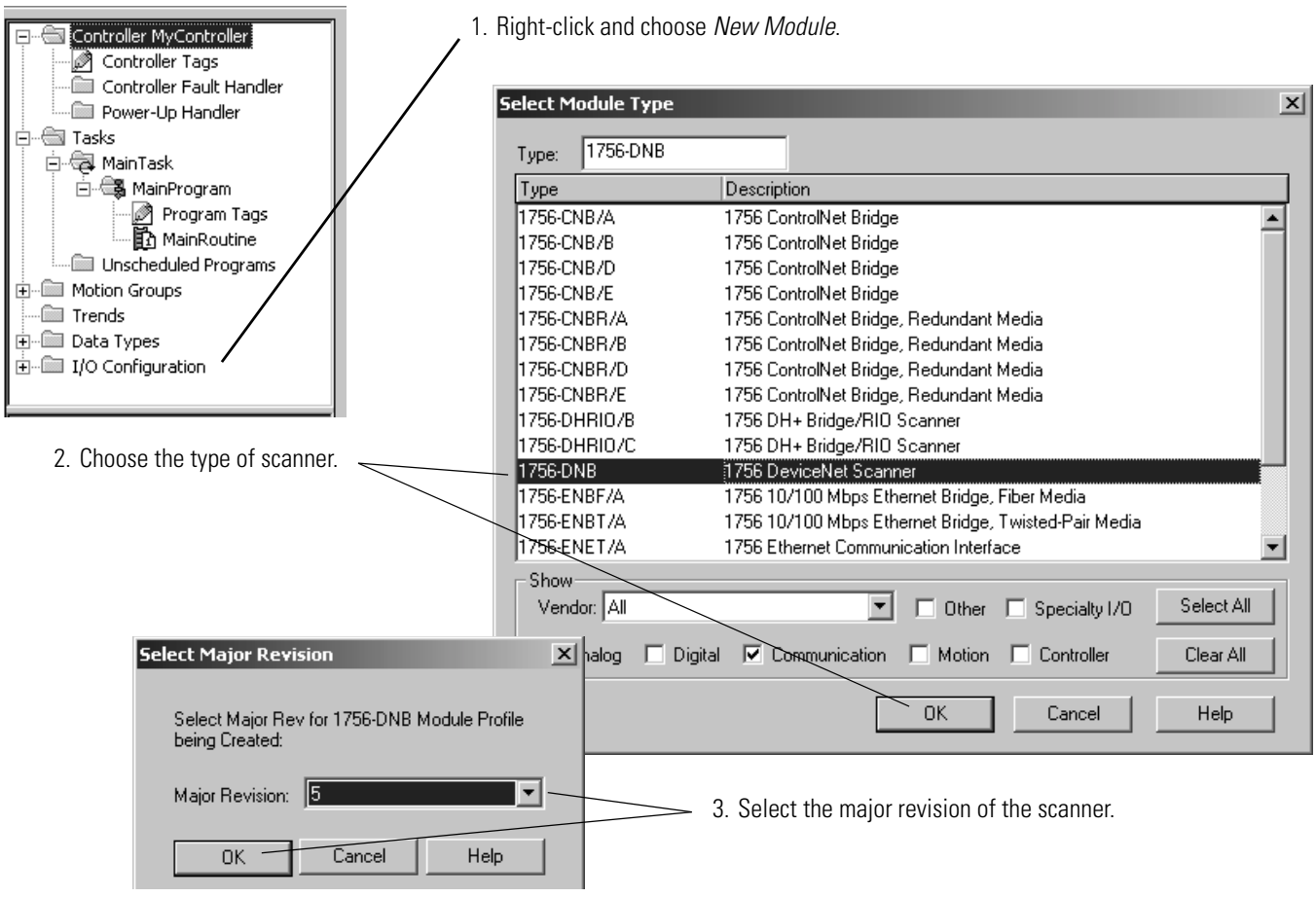


Add the Scanner to the RSLogix 5000 Project

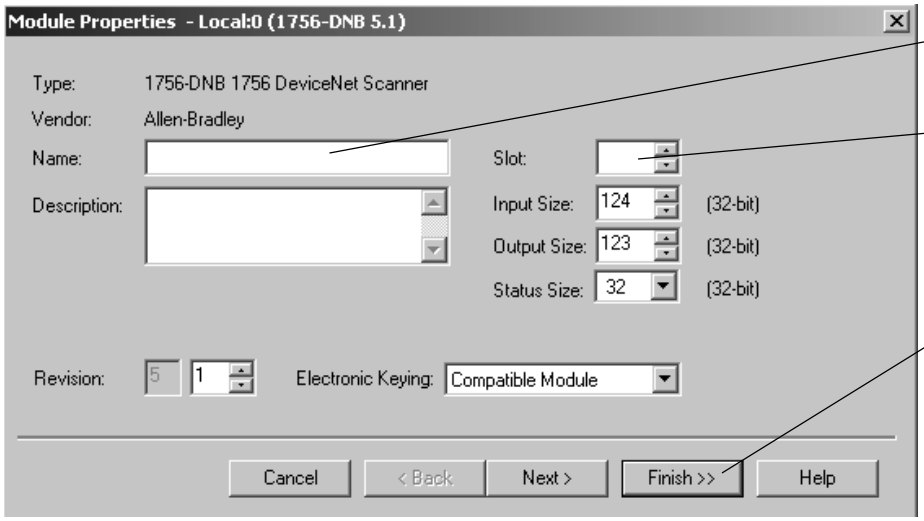
To access the data of your network, add the scanner to the I/O configuration of the controller. To add a scanner:

Step:	See page:
❑ Add the Scanner to the I/O Configuration Folder	4-6
❑ Define the Properties of the Scanner	4-7

Add the Scanner to the I/O Configuration Folder



Define the Properties of the Scanner

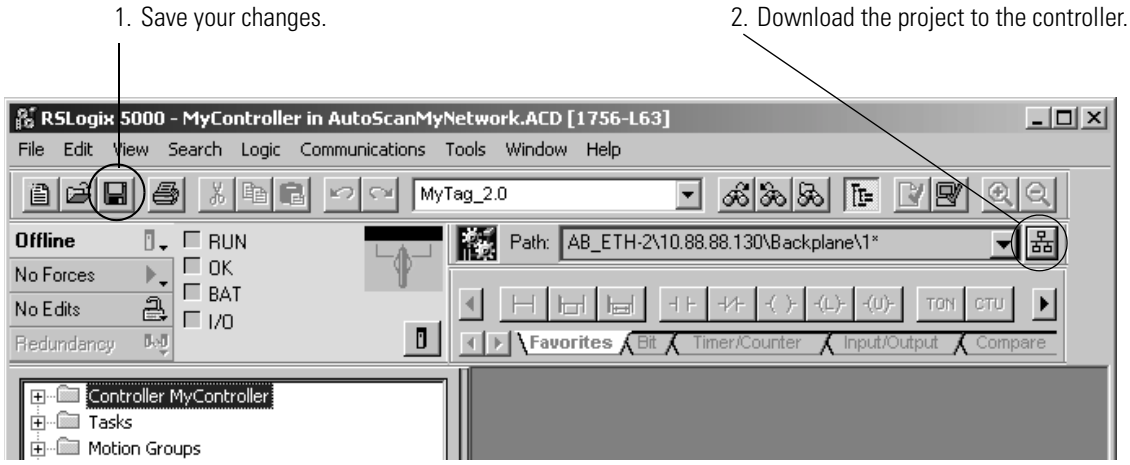


Turn On AutoScan

To turn on AutoScan:

Step:	See page:
❑ Download the RSLogix 5000 Project and Go Online	4-7
❑ Turn On AutoScan	4-8

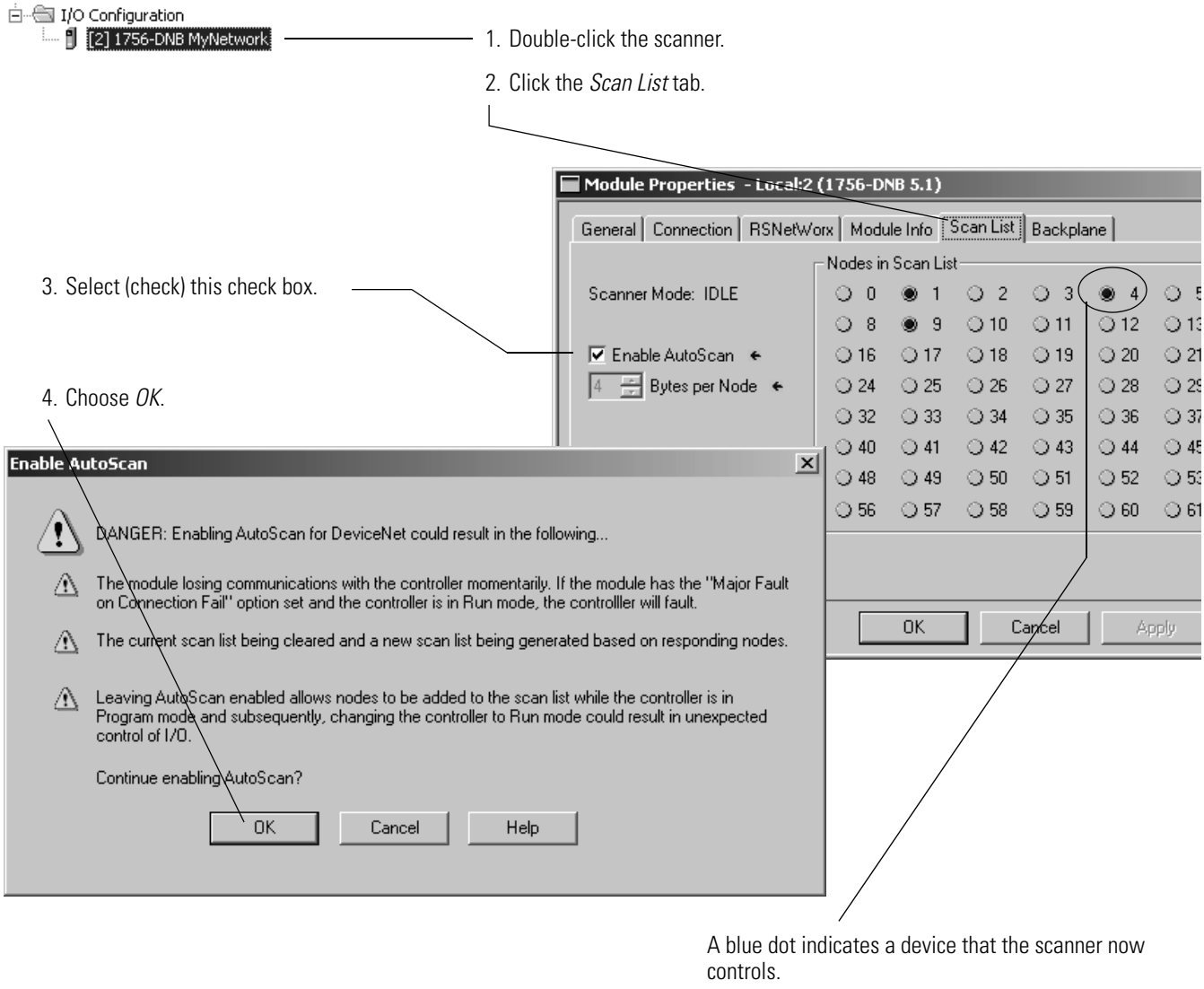
Download the RSLogix 5000 Project and Go Online



Turn On AutoScan

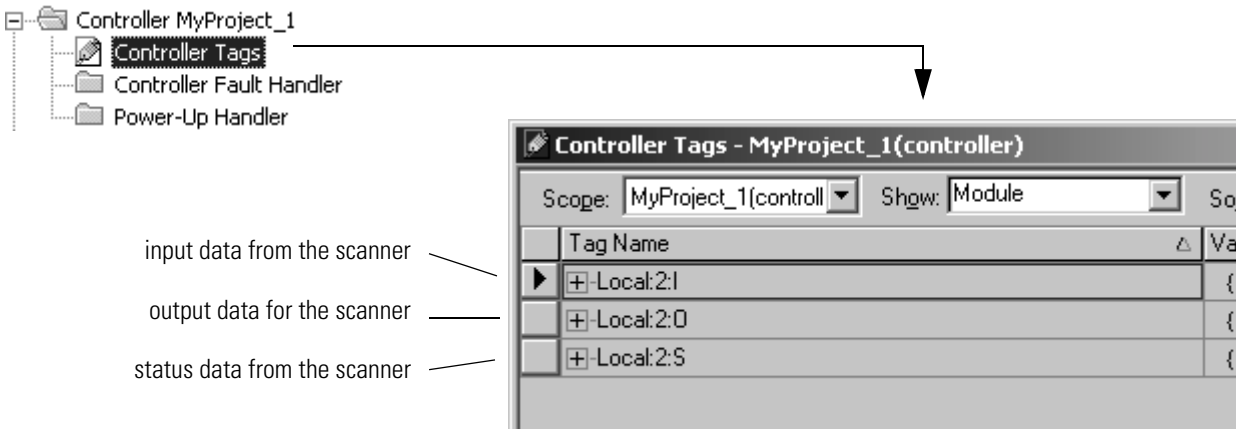
IMPORTANT In the following steps, you clear any existing configuration from the scanner and reconfigure its to communicate with the devices on your network.

- In the controller, this may change the tag addresses of the devices.
- If you have already programmed your logic, make sure that it still addresses the correct data.



Access Device Data

When you add the scanner to the I/O configuration of the controller, RSLogix 5000 software automatically creates a set of tags for the input, output, and status data of the network:



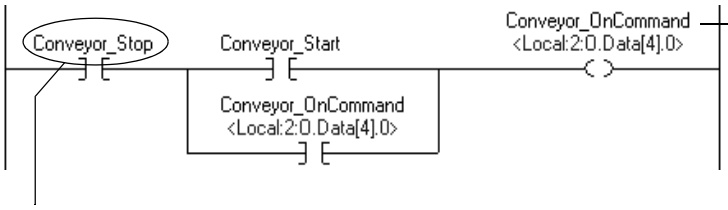
The tags for your DeviceNet data follow this format:

location	*:type*	.Data	*[dnet_address]*	*.bit*

= Optional

Where:	**Is:**		
location	location of the scanner in the system		
	If you have this scanner:	**In a:**	**Then location is:**
	ControlLogix 1756-DNB	local chassis	`Local:`*`slot_number_of_scanner`*
		remote chassis	*`adapter`*`:`*`slot_number_of_scanner`* where: *`adapter`* is the name of the EtherNet/IP or ControlNet module in the remote chassis.
	FlexLogix 1788-DNBO	→	name of the scanner in the I/O configuration of the controller
type	type of data:		
	Where:	**Is:**	
	input from a device	I	
	output to a device	O	
dnet_address	address of the device on the DeviceNet network (based on 4 bytes per node)		
bit	specific bit within the data of the device		

While you can use the input and output tags of the scanner directly in your logic, it is a lot easier to use alias tags.

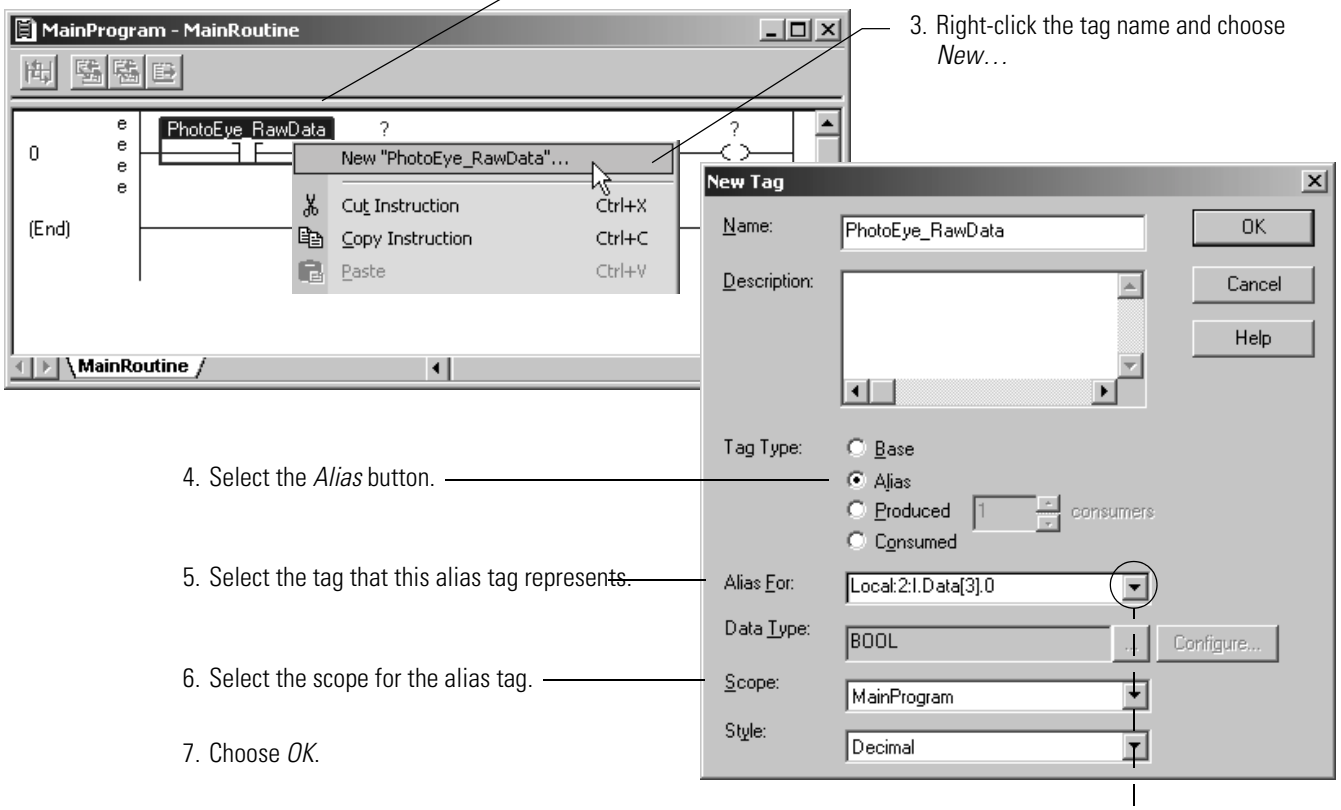


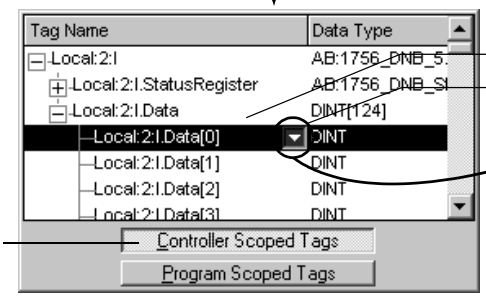
As an option, create tags that describe each device without pointing them to the actual addresses of the devices. Later, convert the tags to aliases for the data of the devices.

alias tag – a tag that represents another tag

- Both tags share the same data.
- When the data changes, both tags change.
- An alias tag provides a descriptive name for data, such as DeviceNet input or output data.
- If the location of the data changes, simply point the alias tag lets to the new location without editing your logic.

1. Enter your logic.
2. Type a descriptive tag name for the DeviceNet data.
3. Right-click the tag name and choose *New…*
4. Select the *Alias* button.
5. Select the tag that this alias tag represents.
6. Select the scope for the alias tag.
7. Choose *OK*.





Look in the controller-scoped tags.

Select the address of the data.

To select a bit, click the ▼.

0	1	2	3	4	5	6	7
8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23
24	25	26	27	28	29	30	31

Put the Scanner in Run Mode

To run the DeviceNet network:

1. Place the controller in run/remote run mode.
2. Set the following bit of the output structure for the scanner:

To put the scanner in run mode, turn on this bit. →

If you want to:	The set this bit:	To:
run the network	…O.CommandRegister.Run	1
not run the network (idle mode)	…O.CommandRegister.Run	0
fault the network	…O.CommandRegister.Fault	1
not fault the network	…O.CommandRegister.Fault	0
disable the network	…O.CommandRegister.DisableNetwork	1
enable the network	…O.CommandRegister.DisableNetwork	0
halt the scanner (ceases all operation)	…O.CommandRegister.HaltScanner	1
unhalt the scanner	…O.CommandRegister.HaltScanner	0
reset the scanner	…O.CommandRegister.Reset	1
resume operation after a reset	…O.CommandRegister.Reset	0

3. Check the scanner for run mode:

If you have this scanner:	Then this indicator:	Displays:
ControlLogix 1756-DNB	4-character display	RUN
FlexLogix 1788-DNBO	I/O	solid green

Additional Information About AutoScan

Type of Connection that the Scanner Sets Up

The type of update (connection) that the scanner sets up with each device depends on the device. The scanner chooses the first connection type that the device supports in this order:

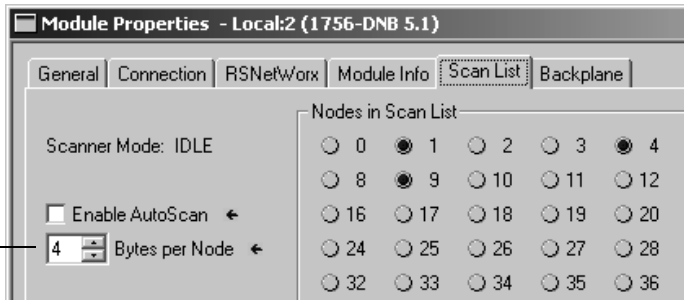
1. change-of-state (COS)
2. polled
3. strobed
4. cyclic at 1000 ms

The scanner tries to set up a change-of-state connection. If the device doesn't support change-of-state, then the scanner tries to set up a polled connection, etc. The type of connection that the scanner sets up may *not* be the default for the device.

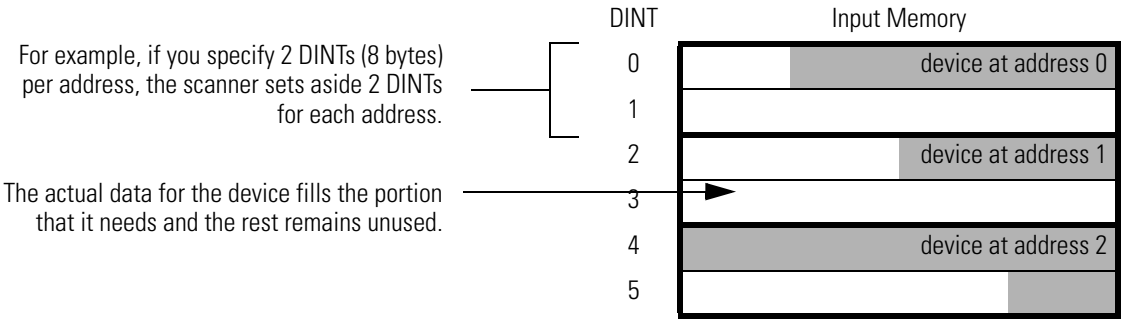
Allocating More Memory for Each Device

The AutoScan feature is easiest to use if you leave it set to 1 DINT (4 bytes) of input memory and output memory for each address.

number of bytes of input memory and output memory to allocate in for each address



As an option, you can allocate more memory for each device.

Consideration:	Description:
1. The bytes/node value defines how much memory for each address.	AutoScan lets you specify how much input and output memory to give to each address on your network. 
2. The scanner sets-up communication with any device that fits within the allocated memory size.	The scanner automatically sets up communication with those devices that fit within the memory allocated for each address. • For example, if you allocate 2 DINTs (8 bytes) per address, the scanner sets up communication with any device that sends or receives 1 - 8 bytes of data. • The scanner adds as many device as it can until it runs out of memory. • If you give too much memory to each address, you may not have enough memory for all your devices.
3. The scanner skips devices that are too large.	If a device needs more memory than is allocated, the scanner skips it and *does not* set up communication with it. For example, if you specify 2 DINTs (8 bytes) per address but a device sends 9 bytes, the scanner *does not* add the device to the scan list.
4. Manually editing the scan list turns off AutoScan.	If you use RSNetWorx software to edit the configuration of the scanner, the scanner turns off AutoScan. *Do not* turn it back on or you will clear the configuration that you just entered. For example, if you use RSNetWorx software to manually add a device to the scan list, the scanner turns off AutoScan. If turn on AutoScan again, the scanner clears it current configuration and starts over.

Notes:

Connect Each Device to the Network

Using This Chapter

This chapter describes how to set the address of a device so it can communicate on your DeviceNet network.

Before You Begin

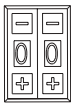
At this point, you should have a list of the devices that you are putting on your network and an address for each of them.

For example:

Device	Address	Input Size of Device (bytes)	Input Memory in Scanner (DINTs)	Output Size of Device (bytes)	Output Memory in Scanner (DINTs)
scanner	0	n/a	n/a	n/a	n/a
PanelView terminal	3	128	32	128	32
<empty>			2		2
I/O adapter w/ modules	5	9	3	5	2
<empty>			2		2
drive	7	4	1	4	1
<empty>			2		2
photoeye	9	1	1	0	0
computer interface	62	n/a	n/a	n/a	n/a
	63				
	Total		43		41

Set the Address of a Device

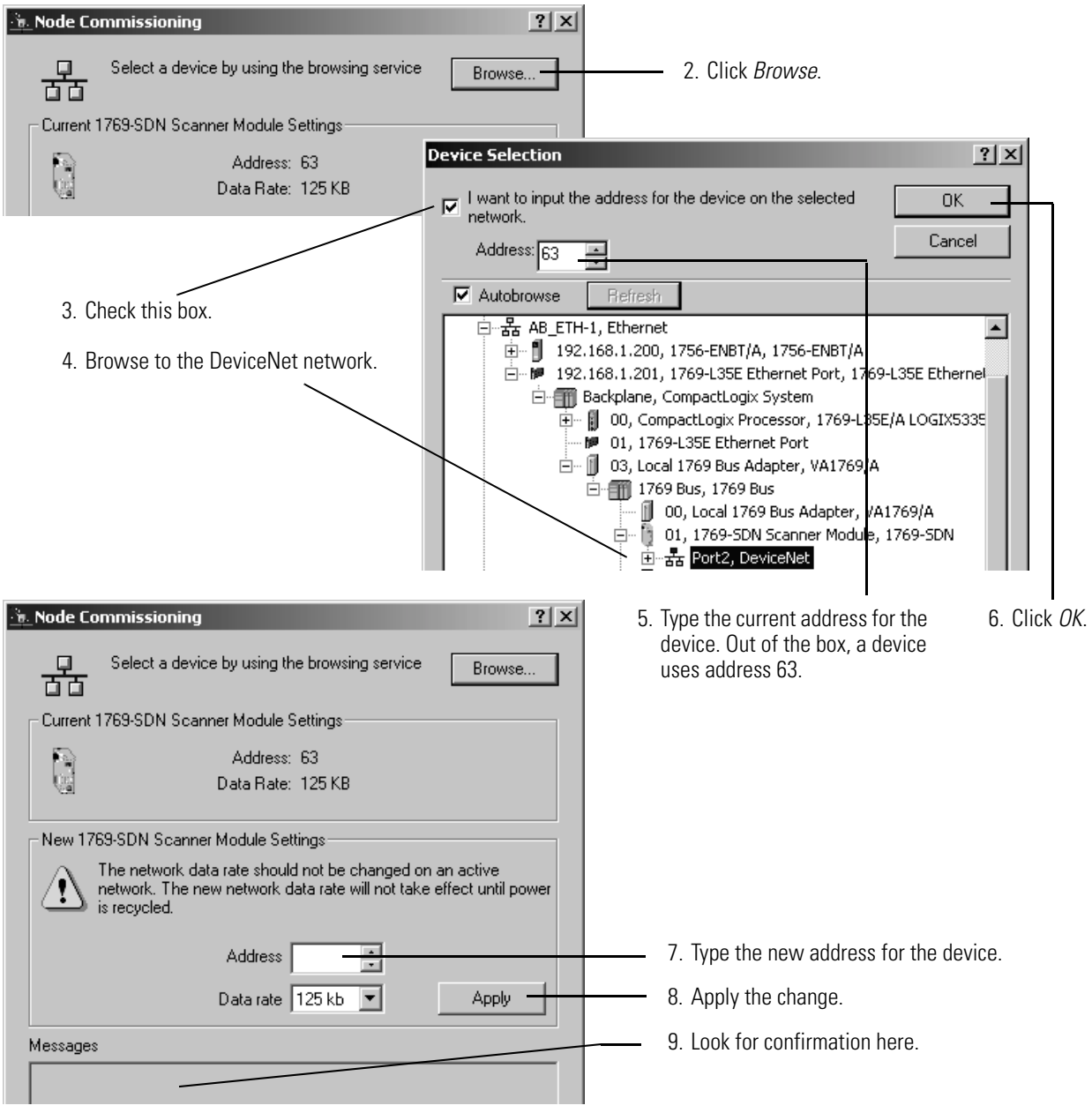
A DeviceNet device uses at least one of the following methods to set its address on the network:

Method:	Description:
switches 	If a device has switches or another hardware mechanism to set its network address, use that mechanism. Keep in mind that a device typically reads the switches on power up. If you change the address, you usually have to cycle power to the device. Some switches also let you set the address of the device via software such as RSNetWorx.
pushbutton	Some devices have a pushbutton that lets you cycle through different addresses. • Usually, the pushbutton is optional. • You can typically also set the address of the device via software such as RSNetWorx.
software	If a device has no switches or other mechanism to set its address, use RSNetWorx for DeviceNet software. Because a device is preset to address 63, connect and set the devices one at a time. Otherwise the address conflicts (all of them at 63) may prevent communication with them.

Set an Address with Software

To use RSNetWorx software to set the address of a device:

1. Choose *Start* ⇒ *Programs* ⇒ *Rockwell Software* ⇒ *RSNetWorx* ⇒ *DeviceNet Node Commissioning Tool.*

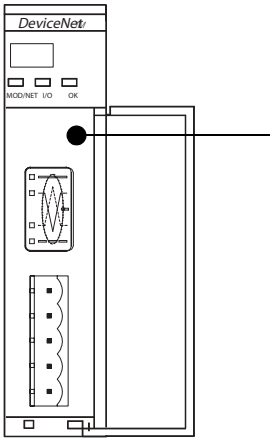


Procedures for Specific Devices

The following sections show how to set the address of specific devices.

For this device:	See page:
ControlLogix Scanner 1756-DNB	5-4
CompactLogix Scanner 1769-SDN	5-4
ControlNet to DeviceNet Linking Device 1788-CN2DN	5-5
DriveLogix and FlexLogix Scanner 1788-DNBO	5-5
EtherNet/IP to DeviceNet Linking Device 1788-EN2DN	5-6
SoftLogix5800 Scanner 1784-PCIDS	5-10

ControlLogix Scanner 1756-DNB

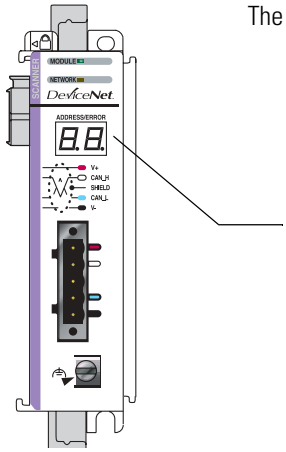


1. Connect the device to the network. (If disconnected or the network power is off, the pushbutton changes the baud rate.)
2. Turn on the power to the device.
3. Press and hold the manual configuration pushbutton until the device displays the desired address.

   When you release the button, the device resets to the new address.
4. After the device resets, check the 4-character display on the front of the module:

If:	Then the:
`A#address`	address is OK
`Duplicate Node Address`	address conflicts with another device

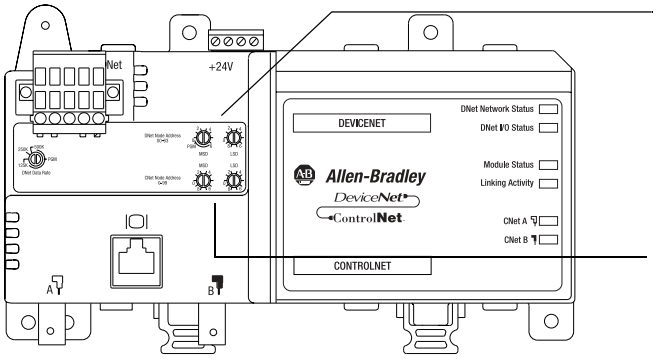
CompactLogix Scanner 1769-SDN



The 1769-SDN device has *no* hardware mechanism to set its address.

1. Connect the device to the network.
2. Turn on the power to the device.
3. Use RSNetWorx software to set the address of the device. See *Set an Address with Software* on page 5-3.
4. After the device resets, check the 2-character display on the front of the device. It shows the status code and address of the device (status code first, then address).

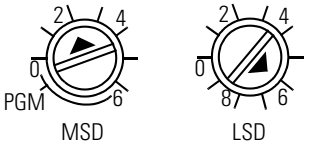
ControlNet to DeviceNet Linking Device 1788-CN2DN



1. Set the DeviceNet address.

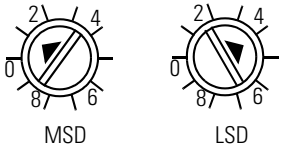
(Switches shown set to node 26)

Do not use the PGM area.



2. Set the ControlNet address.

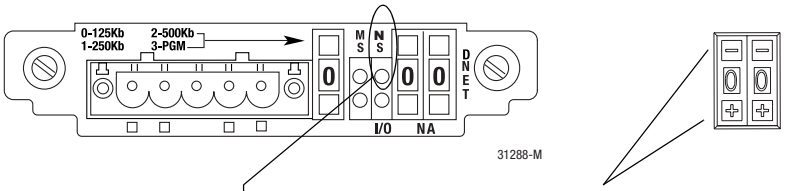
(Switches shown set to node 14)



3. Connect the device to the DeviceNet and ControlNet networks.
4. Turn on power to the device.
5. Check the DeviceNet network status light.

If:	Then the:
green (flashing or solid)	address is OK
solid red	address and/or baud rate conflict with another device

DriveLogix and FlexLogix Scanner 1788-DNBO

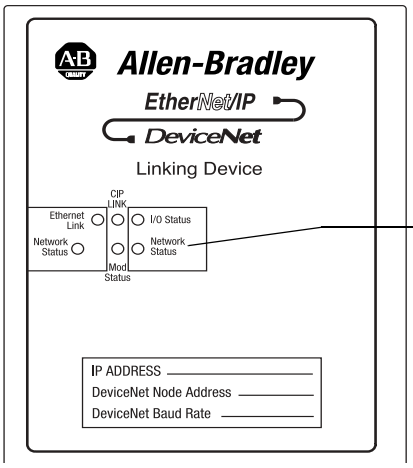


1. To change the address, press the button above or below a number.
2. Connect the device to the network.
3. Turn on power to the device.
4. Check the NS (network status) light.

If:	Then the:
green (flashing or solid)	address is OK
solid red	address and/or baud rate conflict with another device

EtherNet/IP to DeviceNet Linking Device 1788-EN2DN

Set the DeviceNet Address



The 1788-EN2DN device has *no* hardware mechanism to set its DeviceNet address.

1. Connect the device to the network.
2. Turn on the power to the device.
3. Use RSNetWorx software to set the address of the device. See *Set an Address with Software* on page 5-3.
4. After the device resets, check the DeviceNet network status indicator:

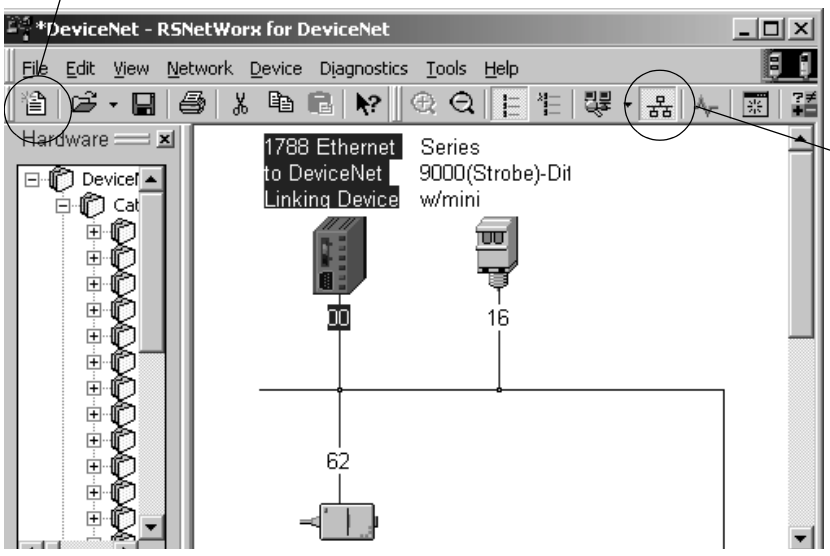
If:	Then the:
green (flashing or solid)	address is OK
solid red	address and/or baud rate conflict with another device

Disable AutoBaud

By default, AutoBaud is enabled for the linking device. If you use the linking device as the scanner for the DeviceNet network, disable AutoBaud for the linking device. The network requires at least one device with a fixed baud rate, which typically is the scanner.

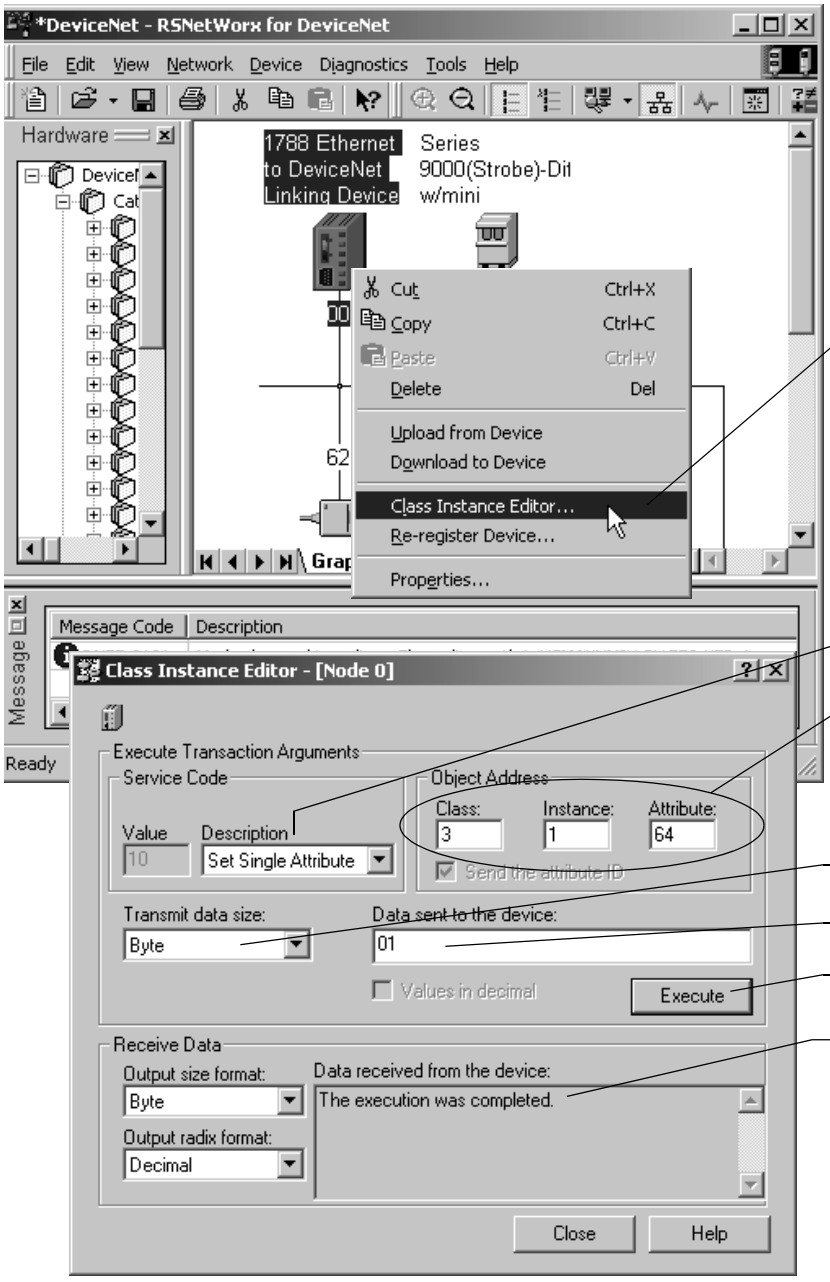
Go Online to Your DeviceNet Network

1. Start RSNetWorx software.
2. Open a new DeviceNet configuration file.

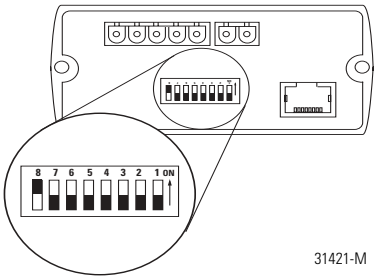


3. Go online to your DeviceNet network.

Disable AutoBaud



1. Right-click the device and choose *Class Instance Editor*.
2. Select *Set Single Attribute*.
3. Type the object address:
   Class = 3
   Instance = 1
   Attribute = 64
4. Select *Byte*.
5. Type a value of 01.
6. Choose *Execute*.
7. Check that the execution was completed.



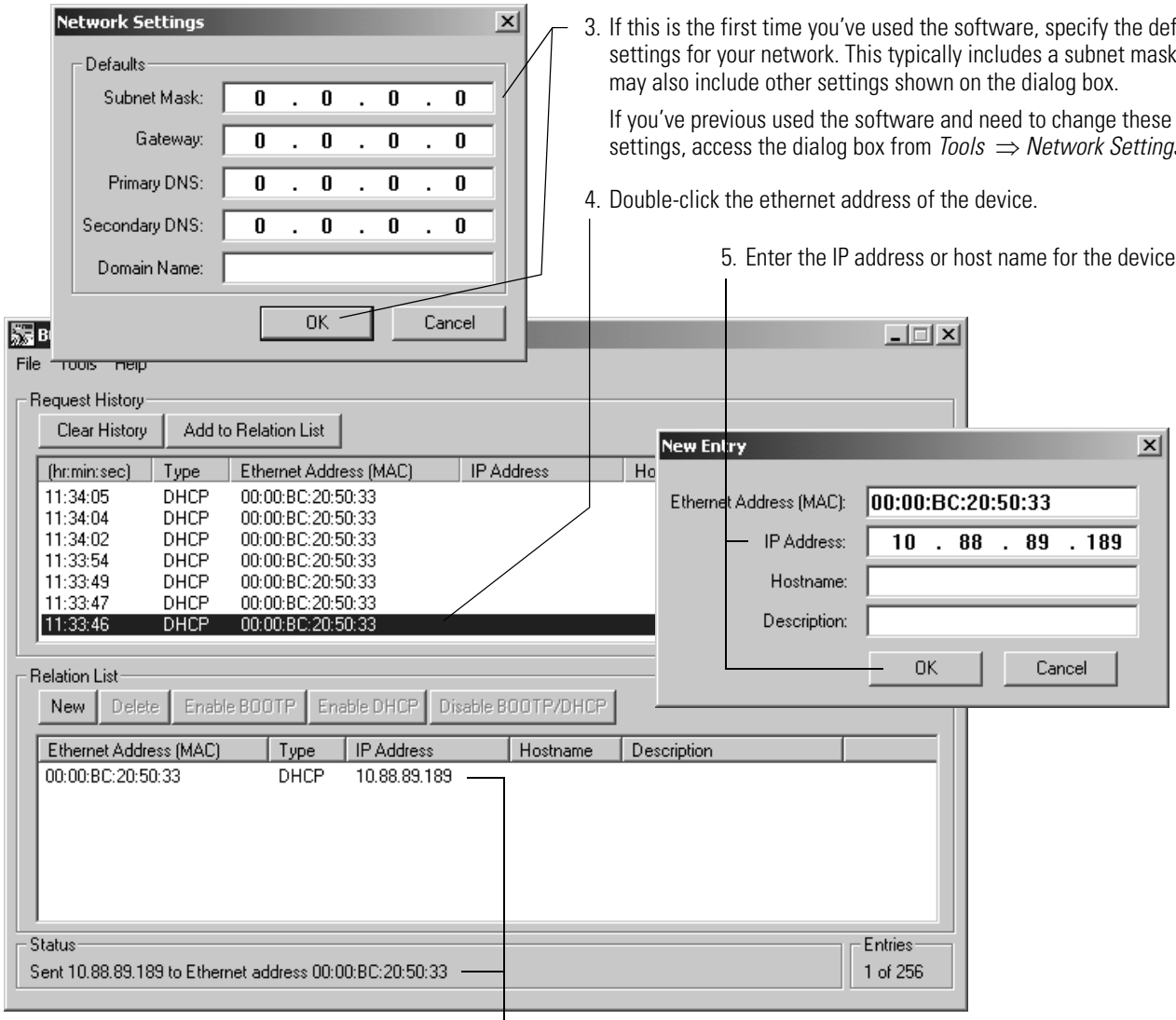
Set the IP Address with BootP/DHCP

If the DIP switch = 0 (default), BootP/DHCP is enabled for the device. On power up, the device requests an IP address from a BootP/DHCP server.

RSLinx software includes a BootP/DHCP server that lets you easily assign an IP configuration to an EtherNet/IP device such as the linking device.

1. Get the ethernet (MAC) address of the device. The ethernet address is on a sticker located on the side of the device. The ethernet address in a format similar to: 00-0b-db-14-55-35.

2. *Start* ⇒ *Programs* ⇒ *Rockwell Software* ⇒ *BOOTP-DHCP server* ⇒ *BOOTP-DHCP server.*



3. If this is the first time you've used the software, specify the default settings for your network. This typically includes a subnet mask but may also include other settings shown on the dialog box.

   If you've previous used the software and need to change these settings, access the dialog box from *Tools* ⇒ *Network Settings*.

4. Double-click the ethernet address of the device.

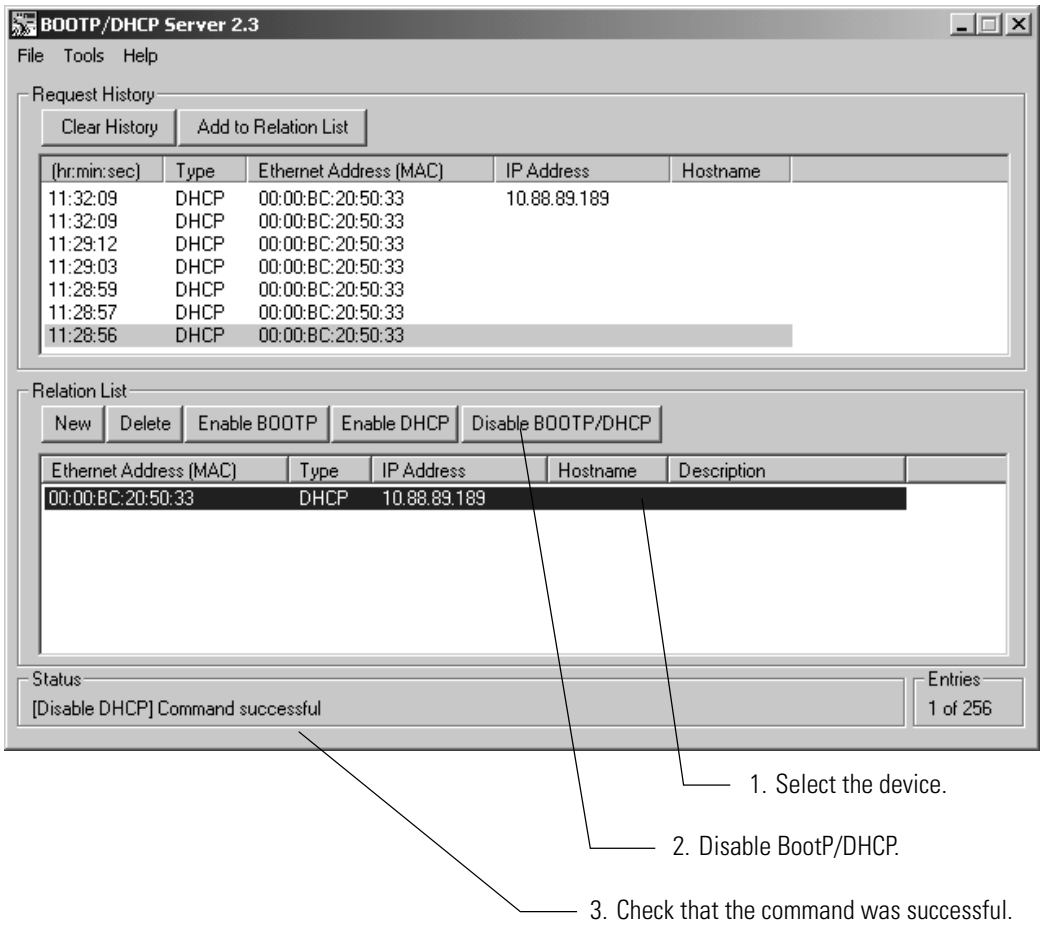
5. Enter the IP address or host name for the device.

6. Check that the relation list shows the device and the status line indicates that the software sent the address to the device.

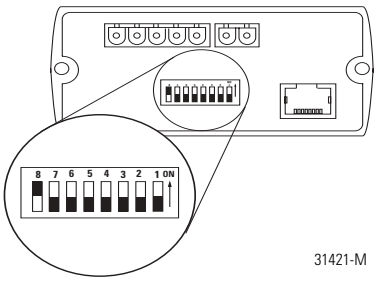
Turn Off BootP/DHCP

If you leave BootP/DHCP enabled for the device, its IP configuration lasts only until the next power cycle. After the next power up, the device sends out a new request for an IP address from a BootP/DHCP server.

To permanently assign the configuration to the device, disable BootP/DHCP.



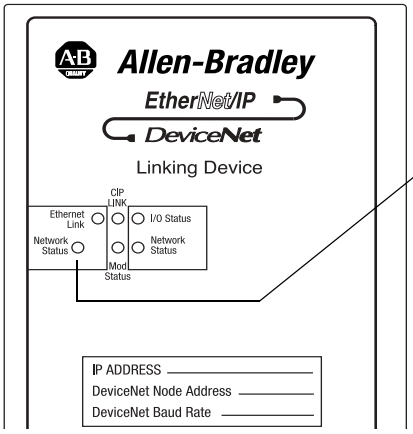
Optional—Set the IP Address with the Configuration DIP Switch



The DIP switch on the end of the linking device lets you set the device to the following IP configuration.

IP address	192.168.1.*n* where: *n* is the value of the DIP switch
Subnet mask	255.255.255.0
Gateway address	0.0.0.0 (No gateway set)

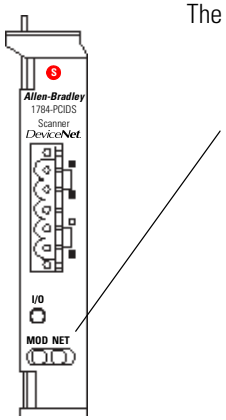
IMPORTANT The numbers on the switch are opposite the address value bit locations; i.e., bit 0 is set by switch 8.



1. Connect the device to the network.
2. Set the switch to the desired value for *n*.
3. Turn on or cycle the power to the device.
4. After the device completes its power-up sequence, check the EtherNet/IP Network Status indicator:

If:	Then the:
green (flashing or solid)	address is OK
solid red	address conflicts with another device

SoftLogix5800 Scanner 1784-PCIDS



The 1784-PCIDS device has *no* hardware mechanism to set its address.

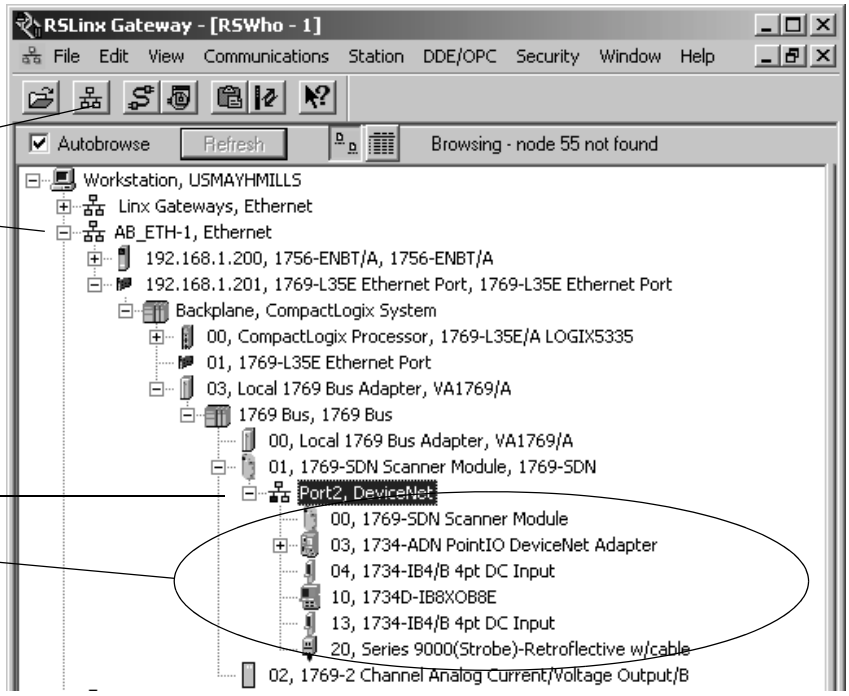
1. In RSLinx software, configure a driver for the scanner. Refer to Configure a Driver for a Network on page 3-3.
2. Check the NET light.

If:	Then the:
green (flashing or solid)	address is OK
solid red	address and/or baud rate conflict with another device

Make Sure Your Devices Are on the Network

Once you have assigned an address to each device, make sure that the devices are communicating on the network.

1. Start RSLinx software.
2. Click the RSWho button.
3. Expand a driver that lets you access the DeviceNet network.
4. Browse to the DeviceNet network.
5. Make sure you see all the devices that are connected to the DeviceNet network.



Notes:

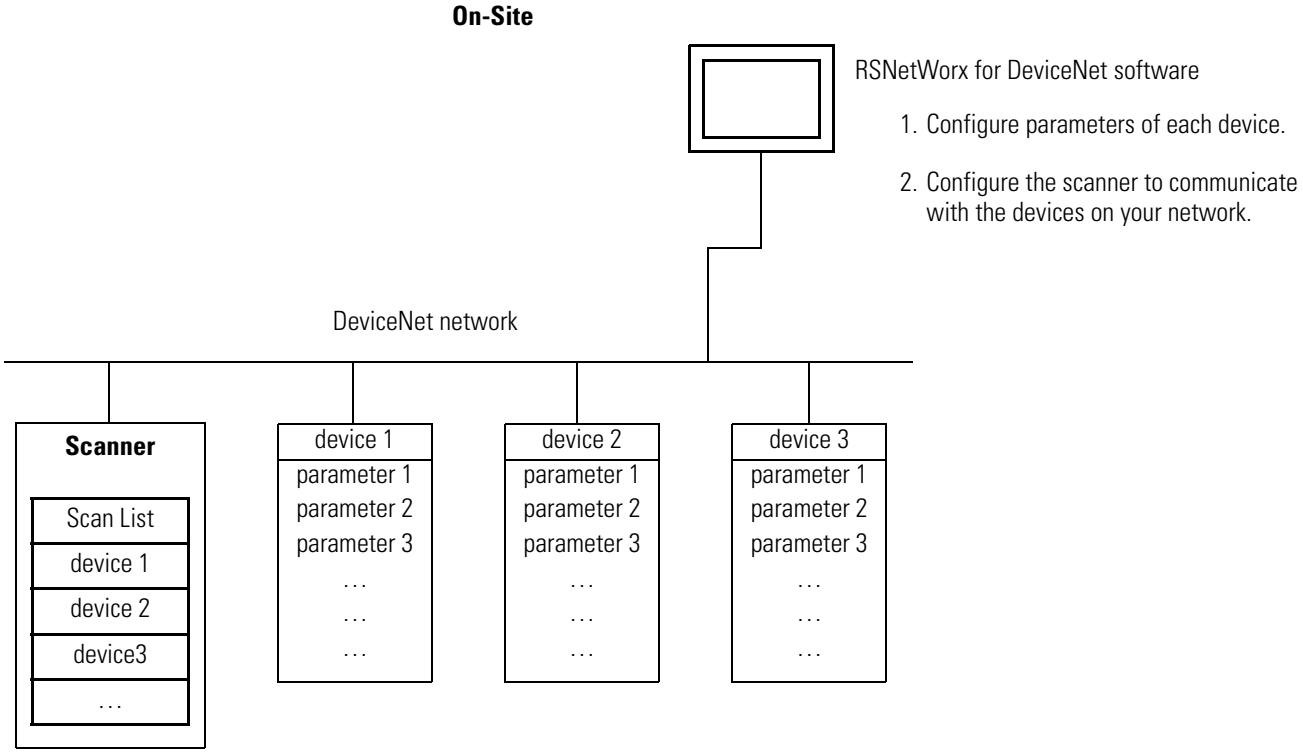
Configure Your Network Online

How to Use This Chapter

To configure your DeviceNet network, you have the following options:

If:	Then configure your network:	See:
Any of the following conditions apply: • The network and devices are *not yet* installed. • You *do not* have access to the network. (I.e., You are off-site.) • You prefer to do most of the configuration before you get on-site with the network.	offline	Chapter 2
Both of the following conditions apply: • The network and devices are *already* installed. • You have access to the network. (I.e., You are on-site.)	online	This chapter

With online configuration, you upload the current configuration of the network. This reduces the number of configuration steps that you have to perform. However, it requires access to the DeviceNet network.



To configure a DeviceNet network while online:

Step:	Page:
❑ Before You Begin	6-2
❑ Create a File for the Network	6-3
❑ Go Online to the Network	6-5
❑ Configure Each Device	6-6
❑ Configure the Scanner	6-9
❑ Upload and Save the Network File	6-16
❑ Generate an RSNetWorx Report	6-17

Before You Begin

Before you configure the network, make sure you have a list of the devices that you are putting on your network and the address for each of them.

For example:

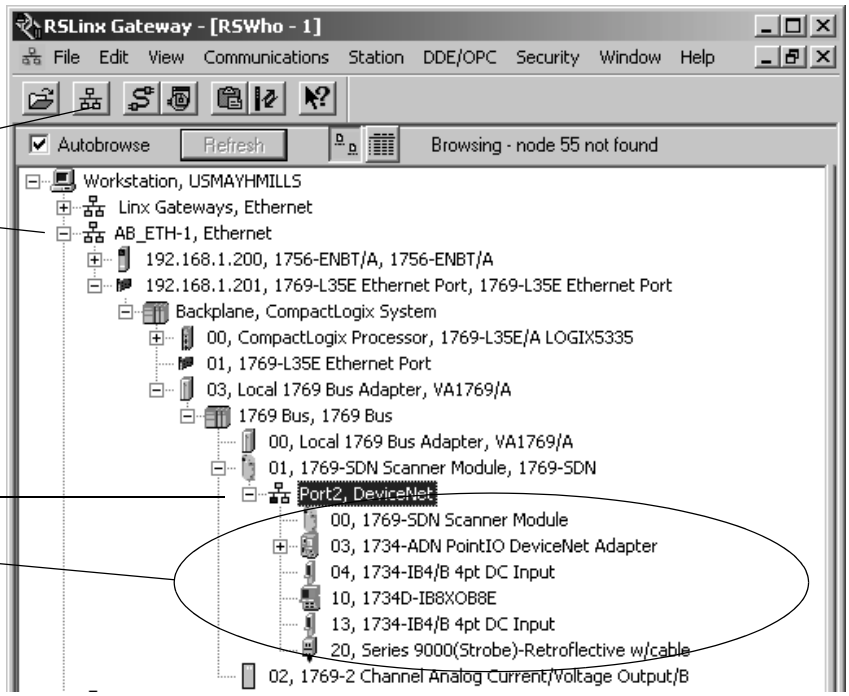
Device	Address	Input Size of Device (bytes)	Input Memory in Scanner (DINTs)	Output Size of Device (bytes)	Output Memory in Scanner (DINTs)
scanner	0	n/a	n/a	n/a	n/a
PanelView terminal	3	128	32	128	32
<empty>			2		2
I/O adapter w/ modules	5	9	3	5	2
<empty>			2		2
drive	7	4	1	4	1
<empty>			2		2
photoeye	9	1	1	0	0
computer interface	62	n/a	n/a	n/a	n/a
	63				
	Total		43		41

To configuration the network online, your computer must also be able to communicate with each device on your DeviceNet network. Make sure that you have completed the following steps:

Step:	See:
☑ Connect a Computer to the System	Chapter 3
☑ Connect Each Device to the Network	Chapter 5

To make sure that you can communicate with all your devices, use RSLinx software to show your DeviceNet network.

1. Start RSLinx software.
2. Click the RSWho button.
3. Expand a driver that lets you access the DeviceNet network.
4. Browse to the DeviceNet network.
5. Make sure you see all the devices that are connected to the DeviceNet network.

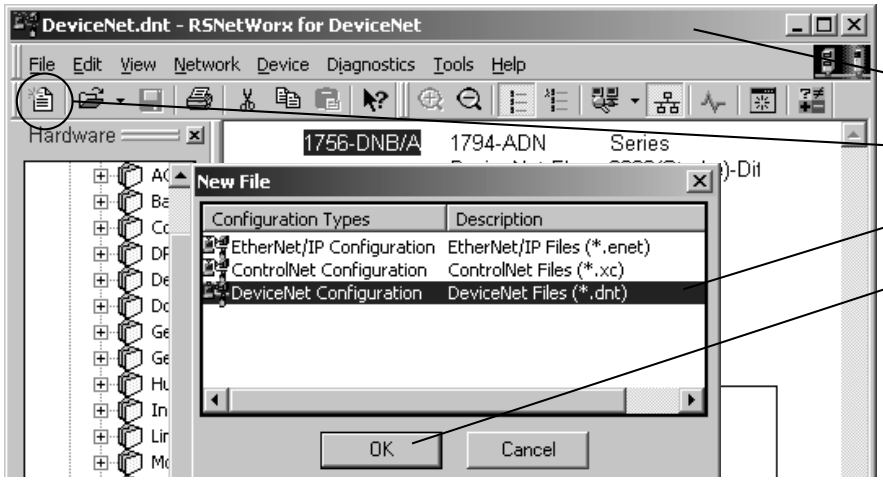


Create a File for the Network

RSNetWorx software stores information about the configuration of each device in a file on your computer.

Step:	See page:
❑ Create a DeviceNet Configuration File	6-4
❑ Give the File a Descriptive Name	6-4

Create a DeviceNet Configuration File



1. Start RSNetWorx software.
2. Create a file.
3. Select *DeviceNet Configuration*.
4. Choose OK.

Give the File a Descriptive Name

Since the file stores the configuration of the network, give it a name that identifies this specific DeviceNet network.

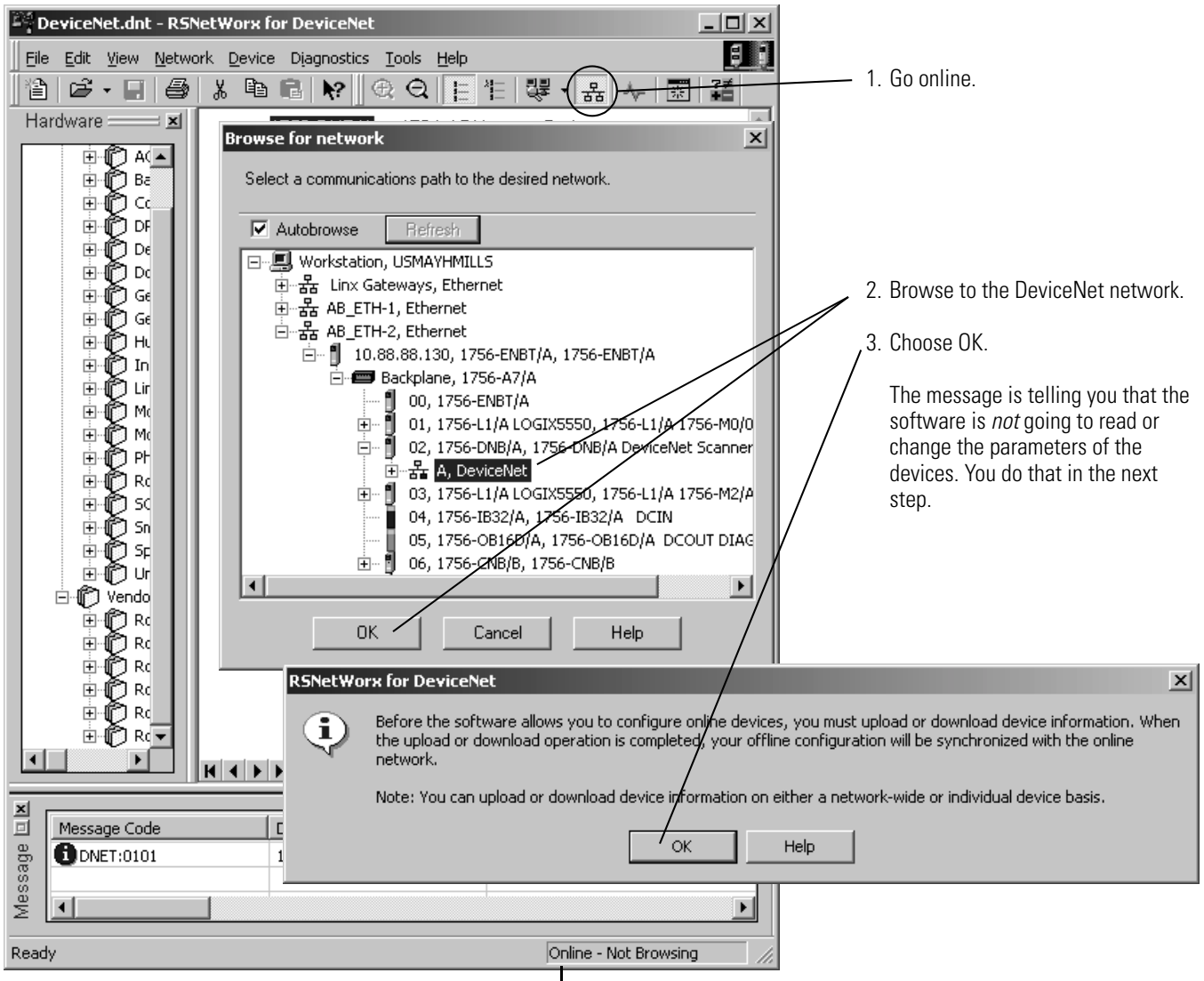
Save the file.

As you work in RSNetWorx software, periodically save your changes to the file for the network.

Go Online to the Network

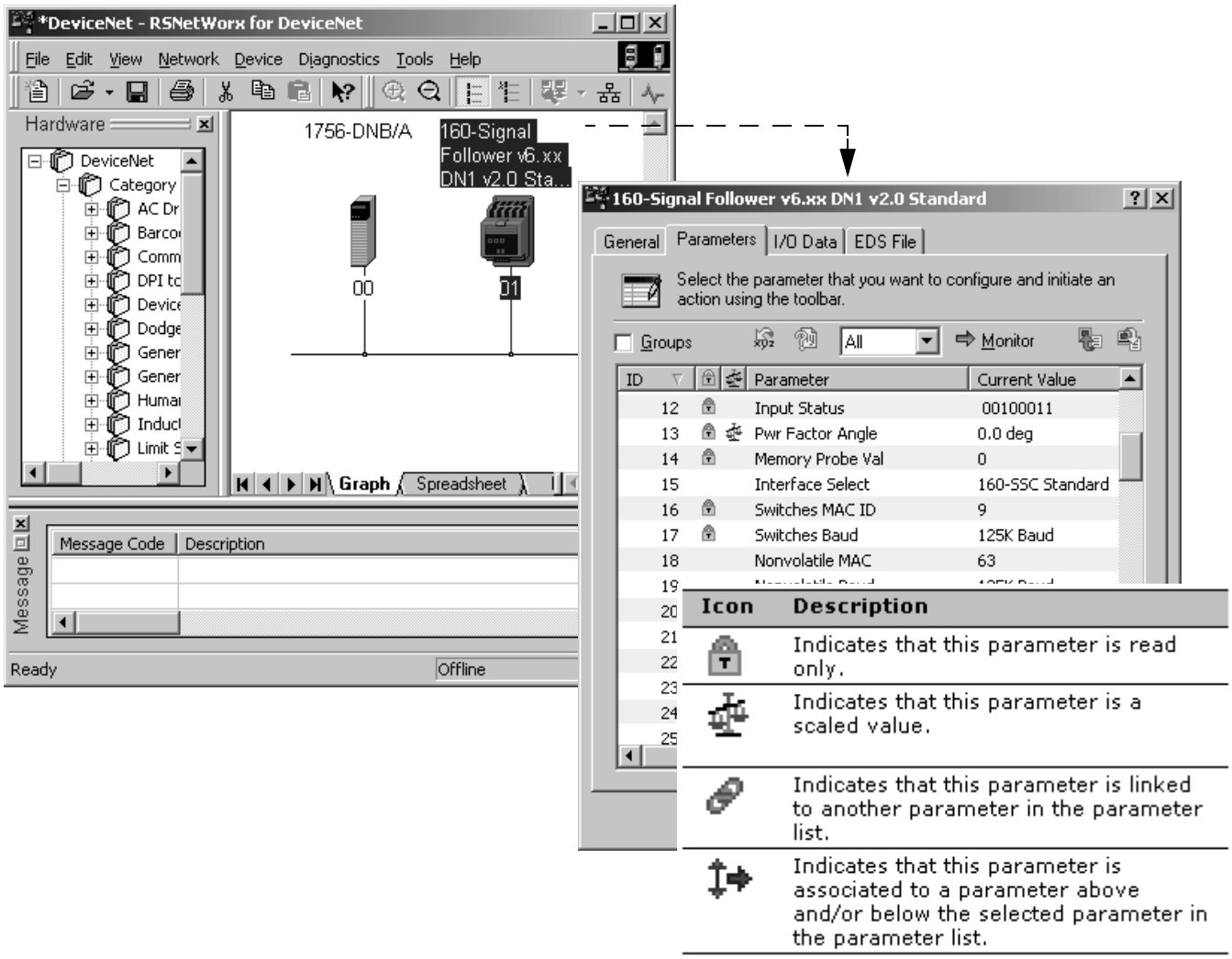
When you go online to a DeviceNet network, RSNetWorx software looks at the network (browses) one time and shows you the devices on the network.

- It *does not* read (upload) or change (download) the parameters of any of the devices.
- The picture you see remains static. It *does not* show any changes since the last browse.



Configure Each Device

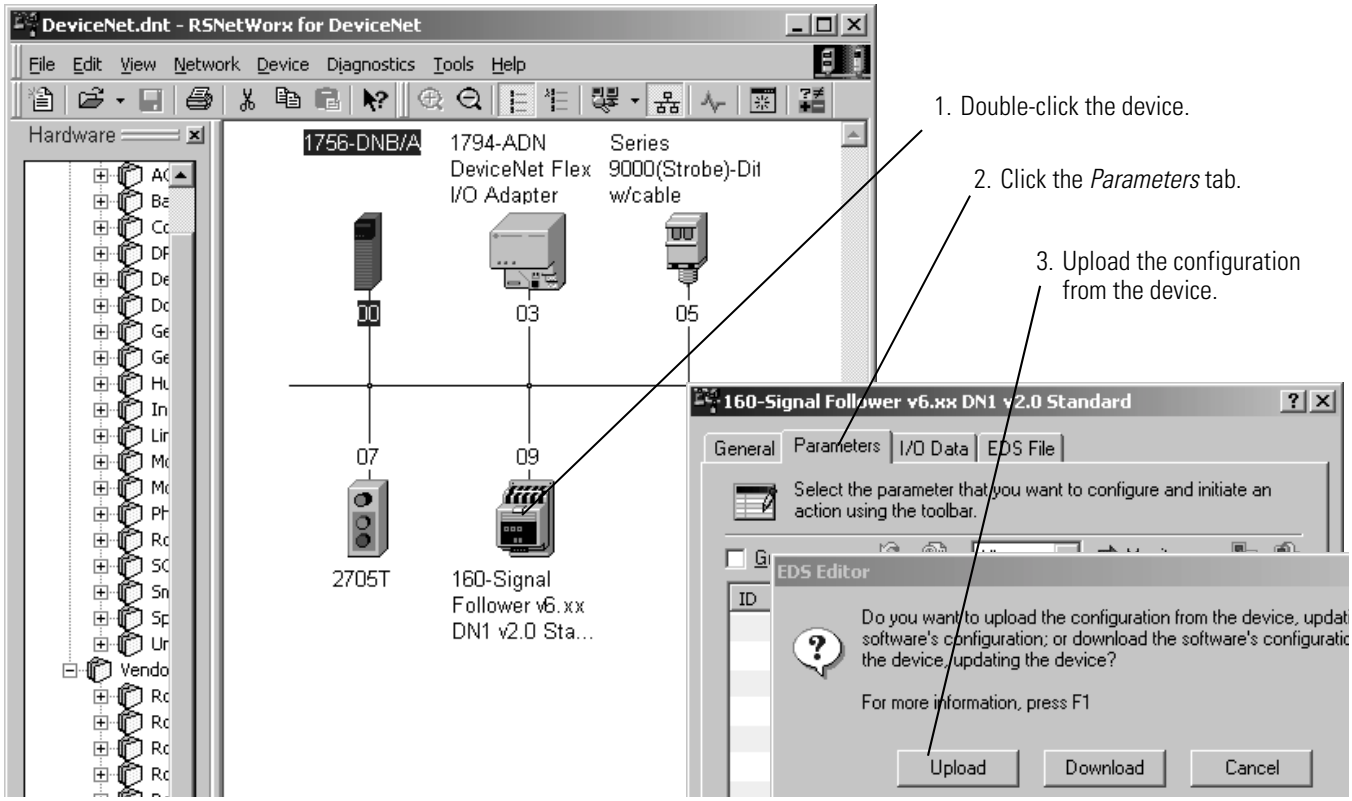
Typically, a DeviceNet device has a set of parameters that define the behavior of the device.



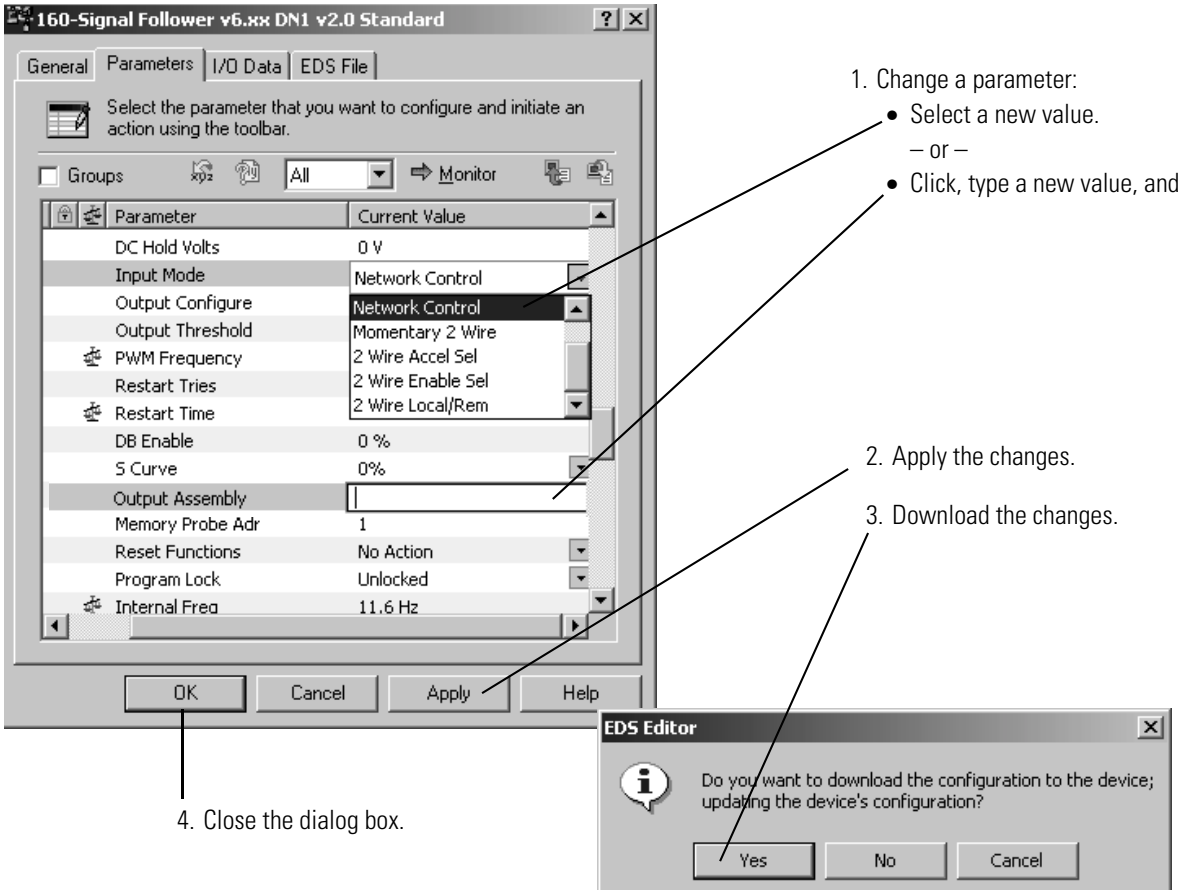
To configure a device online:

Step:	See page:
❑ Upload the Configuration of a Device	6-7
❑ Change and Download Parameters	6-8

Upload the Configuration of a Device

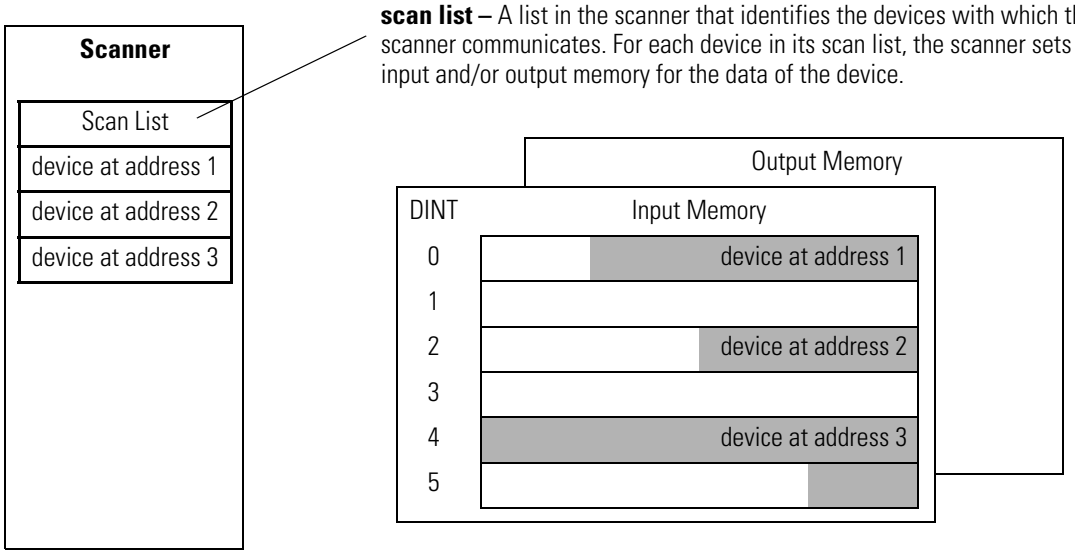


Change and Download Parameters



Configure the Scanner

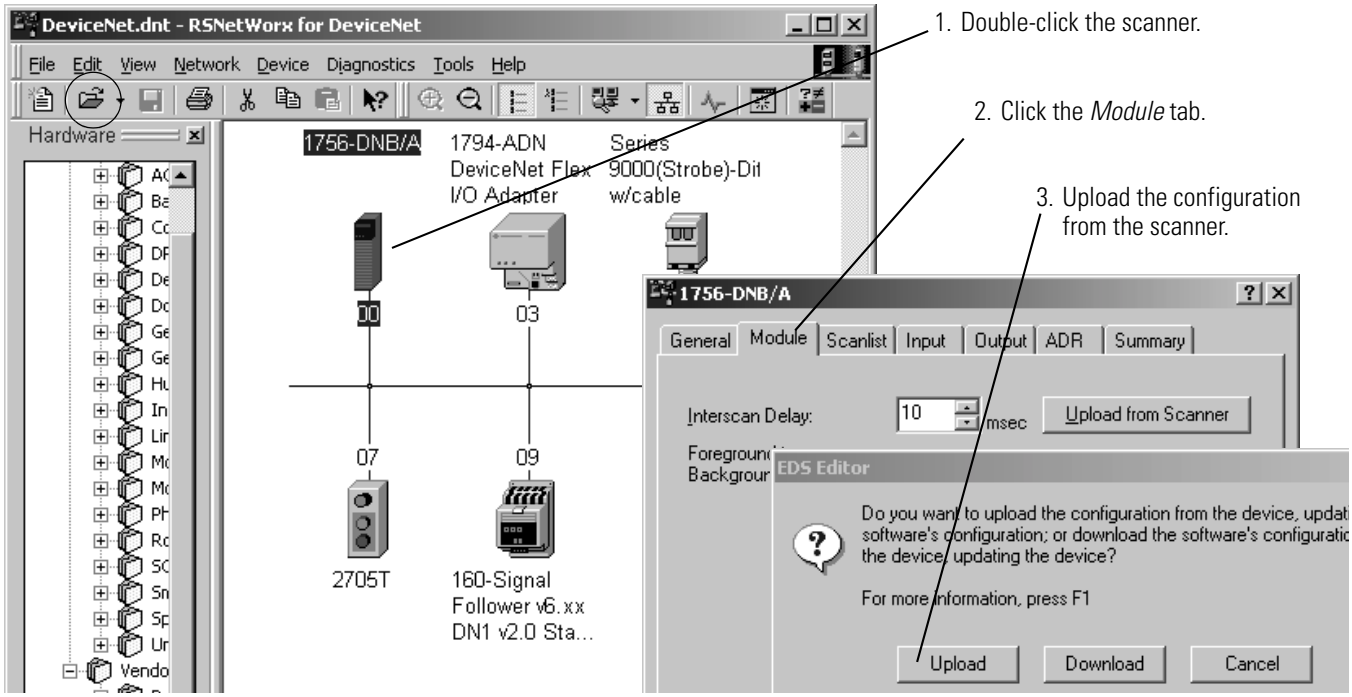
To configure the scanner to communicate with the devices on your network, you set up a scan list in the scanner. Then you define memory locations for the data of each device.



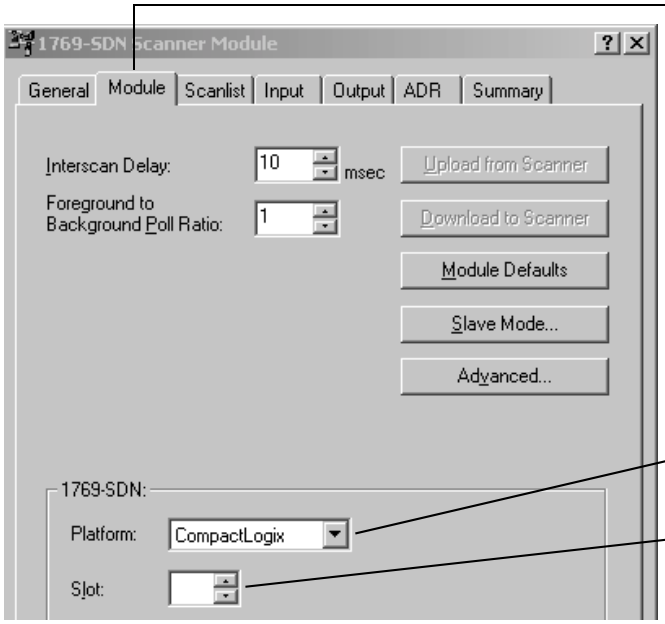
To configure the scanner online:

Step:	See page:
❑ Upload the Current Configuration of the Scanner	6-10
❑ Define the Properties of the Scanner	6-11
❑ Set the Alignment Option	6-12
❑ Clear or Set the Automap on Add Check Box	6-13
❑ Build the Scan List	6-14
❑ Manually Assign Each Device to a Memory Location	6-15
❑ Download the Configuration to the Scanner	6-16

Upload the Current Configuration of the Scanner



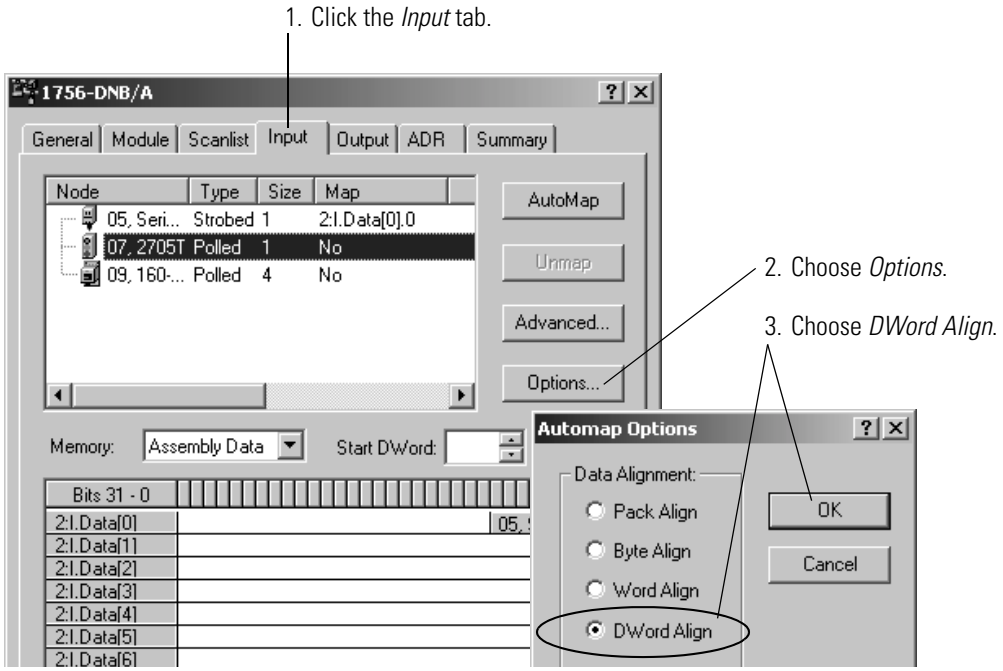
Define the Properties of the Scanner

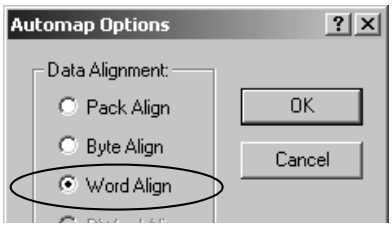


1. Click the *Module* tab
2. If this is a CompactLogix scanner (1769-SDN), choose *CompactLogix*.
3. If the scanner uses a slot number, type its slot number.

Set the Alignment Option

TIP The alignment option you choose applies to both the input and output maps.



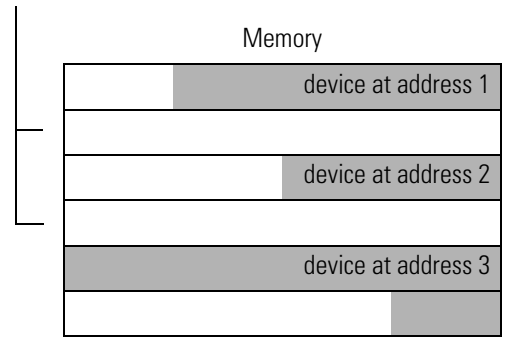
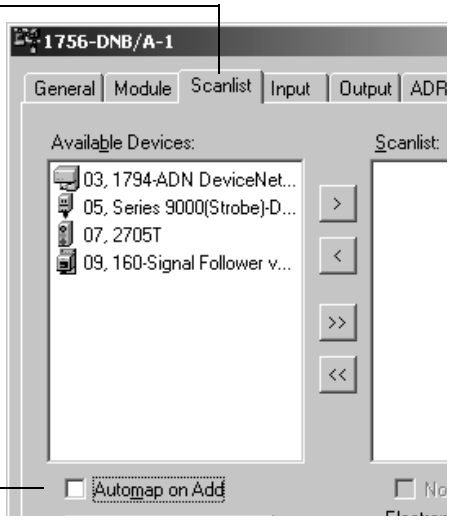
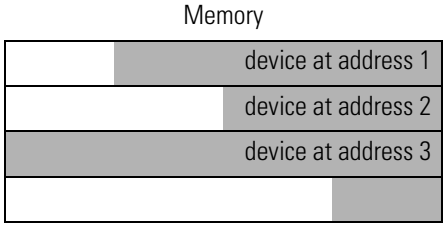
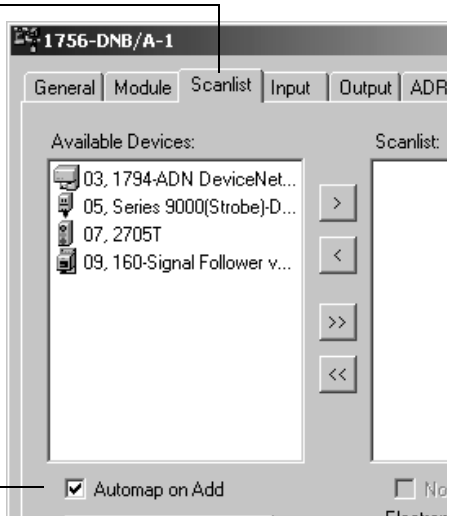


If You Have a SoftLogix5800 Controller

The SoftLogix5800 scanner 1784-PCIDS organizes its input and output memory in 16-bit words. For that scanner, choose *Word Align*.

Clear or Set the Automap on Add Check Box

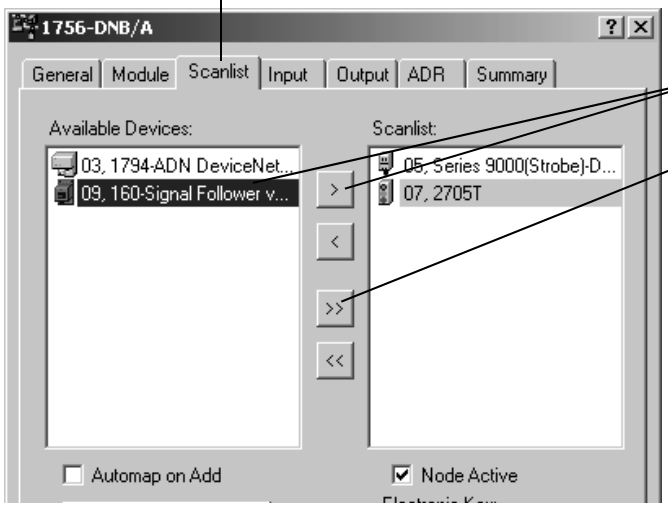
As an option, RSNetWorx software can automatically assign the memory location for each device. Depending on how you want to organize the memory, you may or may not want to use this option.

If you want to:	Then:
leave gaps between devices 	1. Click the *Scanlist* tab 2. Clear (uncheck) the *Automap on Add* check box  After you add your devices to the scan list, manually assign the memory location for each device.
place devices in sequential DINTs 	1. Click the *Scanlist* tab 2. Set (check) the *Automap on Add* check box.  As you add your devices to the scan list, the software automatically assigns the memory locations for each device.

Build the Scan List

1. You should be at the *Scanlist* tab

2. Add devices to the scan list.



To add:	Do this:
devices one at a time	Select a device and click the > button.
all the devices at once	Click the >> button.

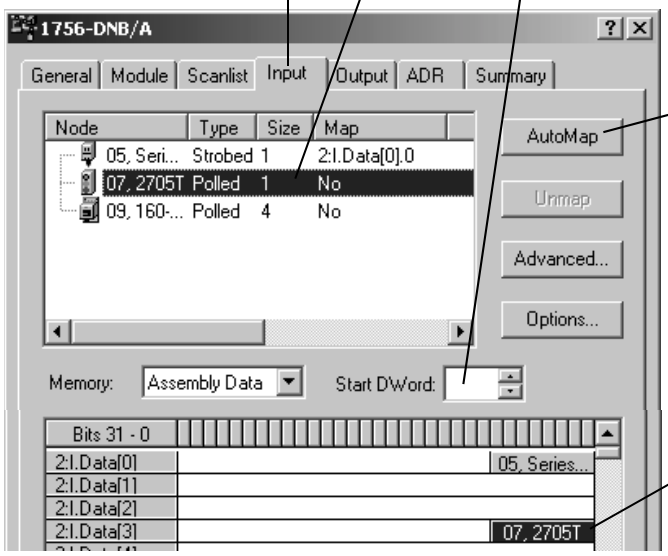
If you get the following warning for a device, see *Set the I/O Parameters of a Device* on page 11-6**.**

Manually Assign Each Device to a Memory Location

IMPORTANT If you used *Automap on Add* (page 6-13).as you built your scan list, then skip this section. Each device already has a memory location.

1. Click the *Input* tab.
2. Select the device.
3. Type the element number to which you want to assign the data. This is the starting point for the data. Larger data sizes wrap to several elements.

   For example, to start the data in …Data[3], type 3 in the Start DWord box.
4. Choose *AutoMap*.



An entry for the device shows up in the input array.

5. Click the Output tab and repeat steps 2 - 4.

Sometimes, a specific input or output value may end up as the upper bytes of a DINT in the scanner.

Instance 70 Data Format (Basic Speed Control Input Assembly)								
Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0						Running1		Faulted
1	Speed Actual RPM (Low Byte)							
2	Speed Actual RPM (High Byte)							
3								

To make your programming easier, use advanced mapping to re-map the value to its own memory location. For more information, see *Give a Value Its Own Memory Location* on page A-1.

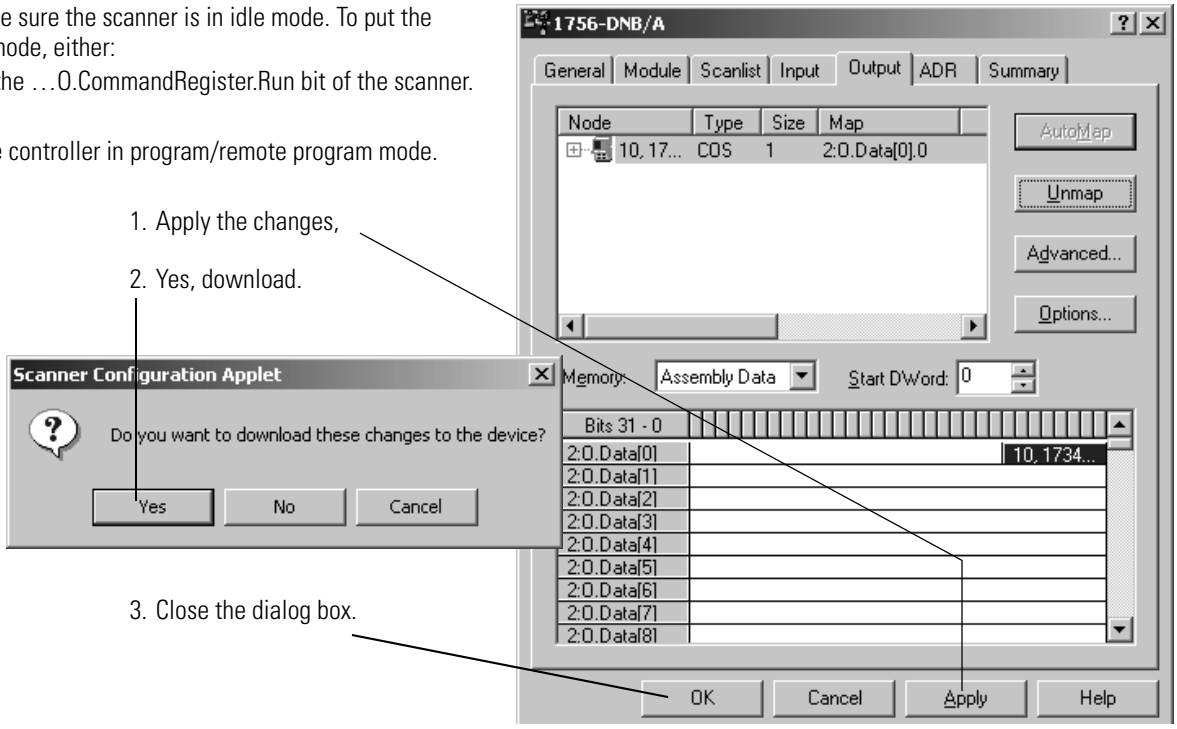
Download the Configuration to the Scanner

Important: Make sure the scanner is in idle mode. To put the scanner in idle mode, either:

- Turn off the …O.CommandRegister.Run bit of the scanner.

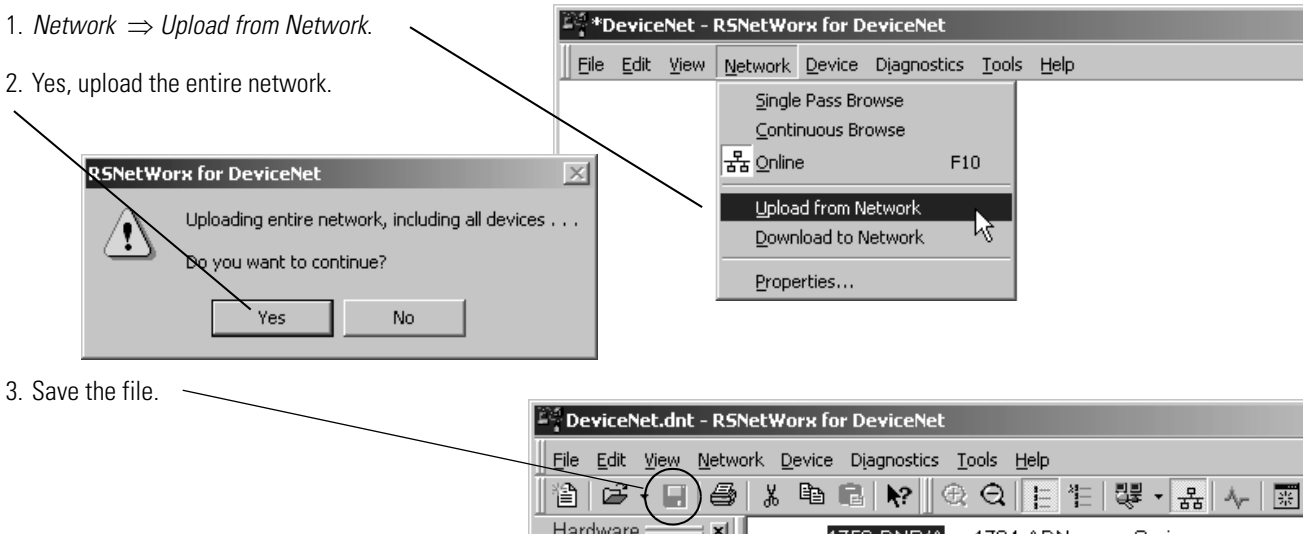
- or -

- Place the controller in program/remote program mode.



Upload and Save the Network File

Once you configure the devices on your network, upload the entire network and save the file. This stores the configuration of each device in your offline file.

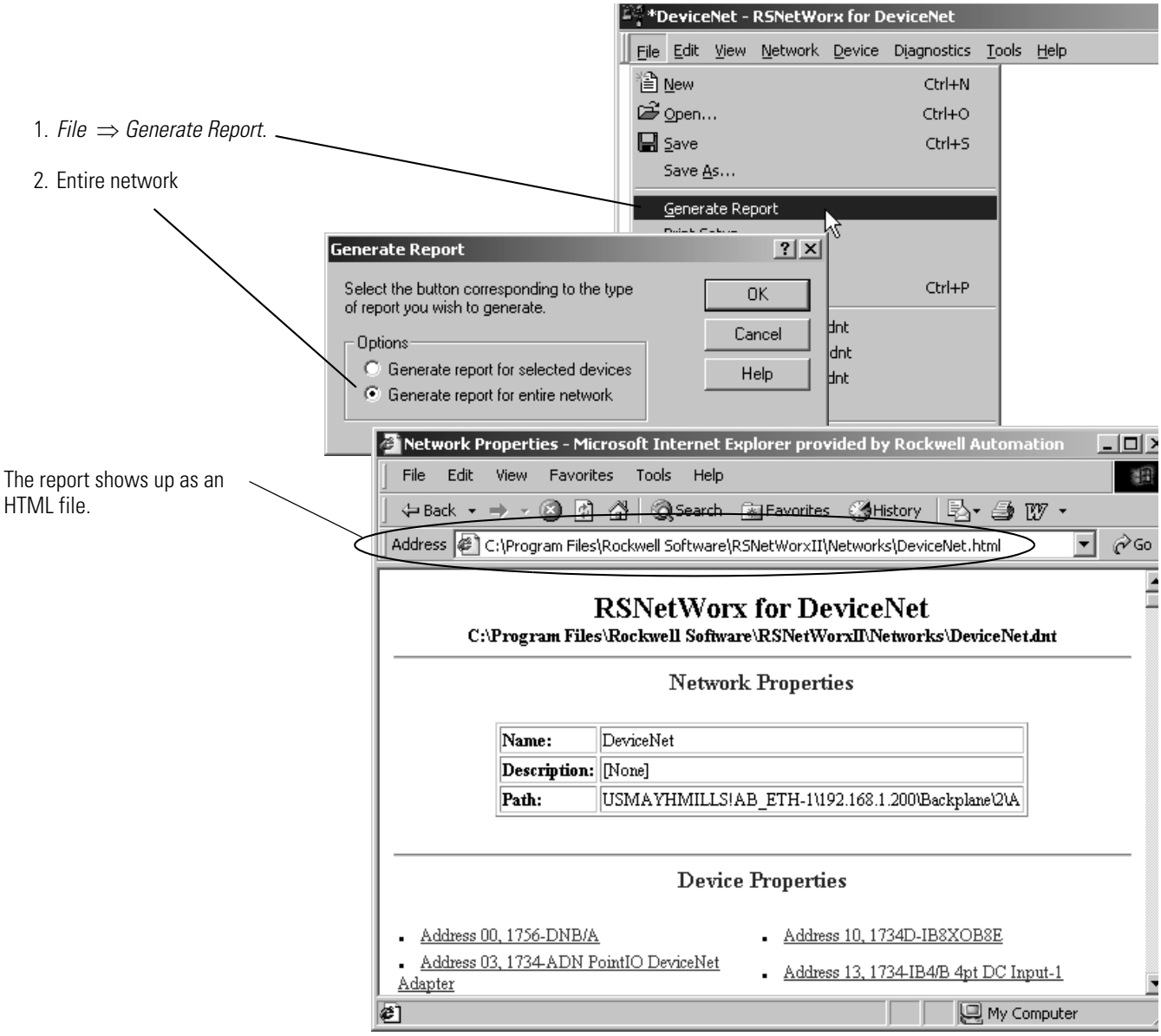


Generate an RSNetWorx Report

An RSNetWorx report shows the following:

- devices on your network
- memory addresses of those devices in the scanner
- configuration of each device

The report is a very useful reference when you program your system.



Notes:

Control a Device

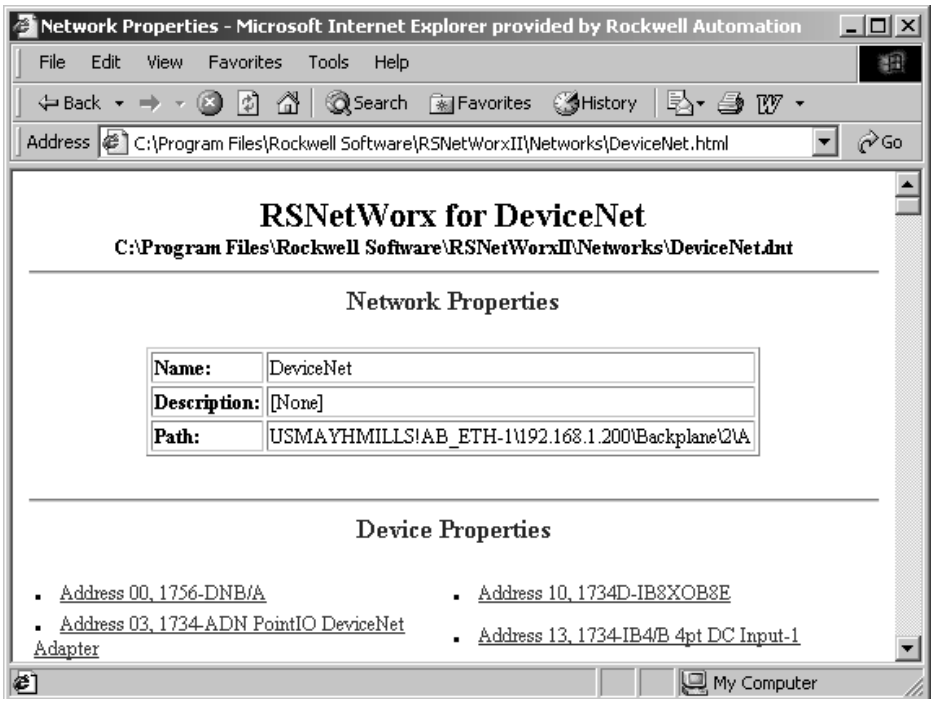
How to Use This Chapter

Use this chapter to develop the logic that examines and controls your devices.

Before You Use This Chapter

Before you use this chapter, get the following information:

RSNetWorx Report for Your Network



Data Map for Each of Your Devices

Instance 70 Data Format (Basic Speed Control Input Assembly)								
Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0						Running1		Faulted
1								
2	Speed Actual RPM (Low Byte)							
3	Speed Actual RPM (High Byte)							

Add the Scanner to the I/O Configuration of the Controller

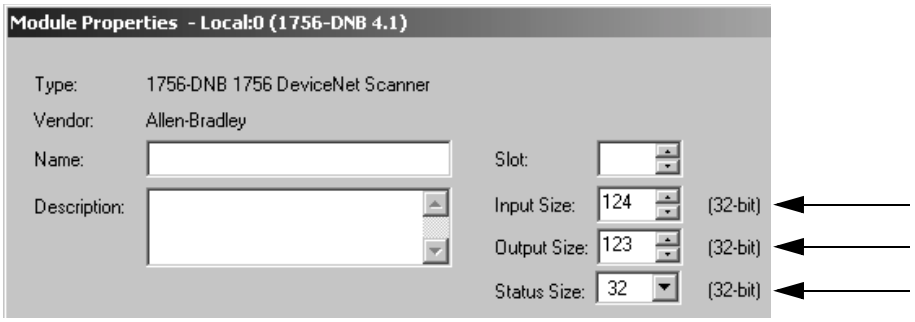
To access the data of your network, add the scanner to the I/O configuration of the controller.

To add a scanner:

Step:	See page:
❑ If You Need to Conserve EtherNet/IP or ControlNet Network Bandwidth	7-3
❑ Add the Scanner to the I/O Configuration Folder	7-5
❑ Define the Properties of the Scanner	7-6

If You Need to Conserve EtherNet/IP or ControlNet Network Bandwidth

The default configuration of the scanner gives you the maximum amount of input, output, and status data.



If the scanner communicates with the controller via an EtherNet/IP or ControlNet network and you need to conserve bandwidth over that network, consider reducing the input, output, or status sizes.

- Set the input and output sizes = the number of input and output DINTs in the scanner that actually store device data.
- If you are *not* going to use all the status information, set the status size to the minimum required. See Table 7.1 on page 7-4.

EXAMPLE

Set the status size for a scanner

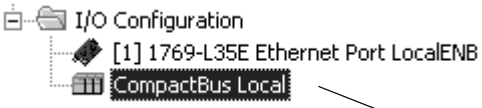
- If you want to *only* use the ASCII representation of scanner status/display, then set the Status Size = 10.
- If you also want to read the status code of the scanner, set the Status Size = 11.

Table 7.1 Set the status size for a scanner

If you want this information:	Set the Status Size to (DINTs):	Which gives you:	
		Member:	**Data Type**
count of I/O scans	10	ScanCounter	DINT
indication that a device has failed: • There is 1 bit for each address on the DeviceNet network (0 -63). • The position of a bit = address of a device. • If a bit = 1, then the device at that address has failed.		DeviceFailureRegister	SINT[8]
indication that the data size of a device does not match the amount of memory allocated for the device in the scanner: • There is 1 bit for each address on the DeviceNet network (0 -63). • The position of a bit = address of a device. • If a bit = 1, then their is a mismatch with that address.		AutoverifyFailureRegister	SINT[8]
indication that a device is idle: • There is 1 bit for each address on the DeviceNet network (0 -63). • The position of a bit = address of a device. • If a bit = 1, then the device at that address is idle.		DeviceIdleRegister	SINT[8]
indication that a device is online: • There is 1 bit for each address on the DeviceNet network (0 -63). • The position of a bit = address of a device. • If a bit = 1, then the device at that address is online.		ActiveNodeRegister	SINT[8]
ASCII representation of scanner status/display		StatusDisplay	SINT[4]
address of the scanner	11	ScannerAddress	SINT
status code of scanner		ScannerStatus	SINT
address with an error: • scrolls through the addresses with errors • ScrollingDeviceStatus member shows the status code		ScrollingDeviceAddress	SINT
status code of an address with an error: • scrolls through addresses with errors • ScrollingDeviceAddress member shows the address		ScrollingDeviceStatus	SINT
possible future expansion of the structure – 5 DINTs	16		
status code of lower 32 devices – 1 byte per device	24	DeviceStatus	SINT[32]
status code of all devices – 1 byte per device	32	DeviceStatus	SINT[64]

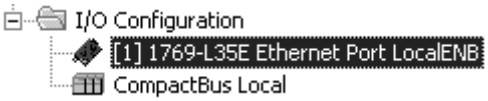
Add the Scanner to the I/O Configuration Folder

CompactLogix scanner



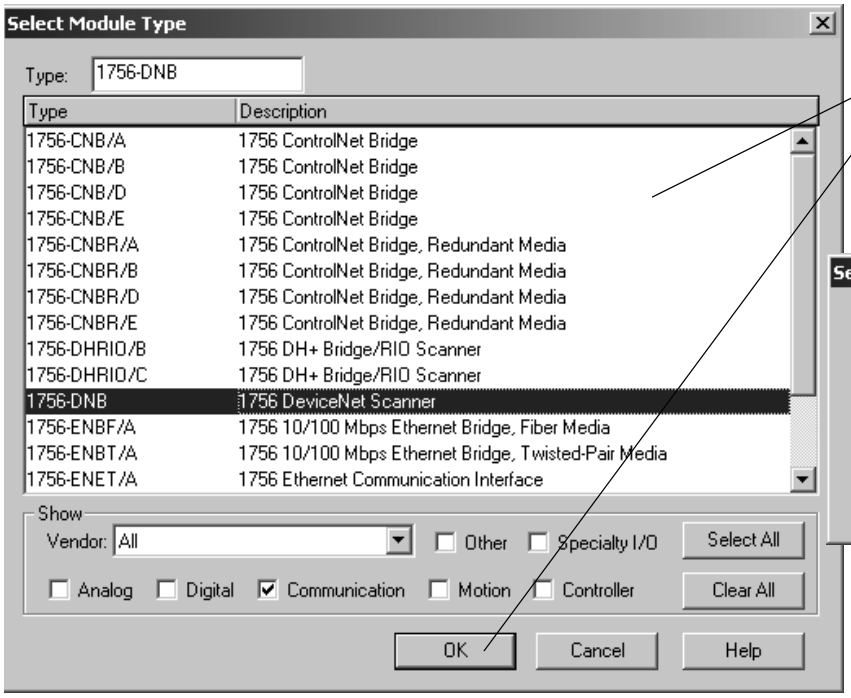
ControlLogix, FlexLogix, and SoftLogix5800 scanners

EtherNet/IP to DeviceNet linking device

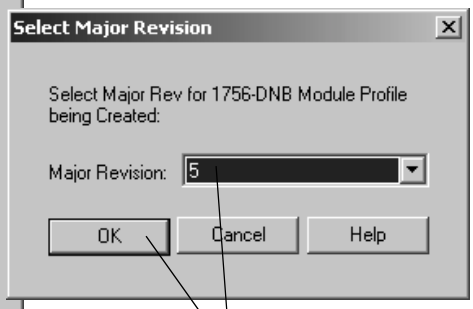


ControlNet to DeviceNet linking device

1. Right-click and choose *New Module*.

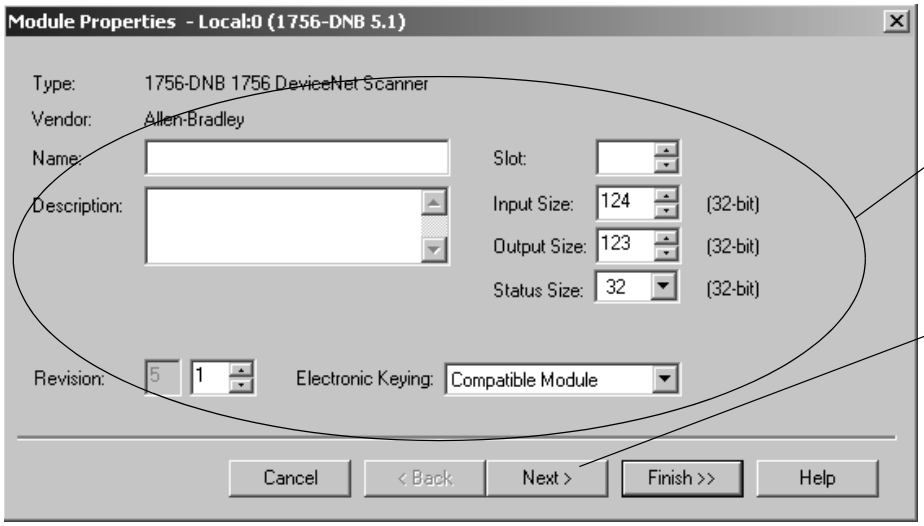


2. Choose the type of scanner.



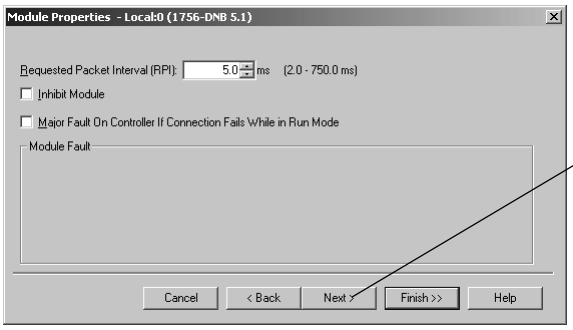
3. Select the major revision of the scanner.

Define the Properties of the Scanner



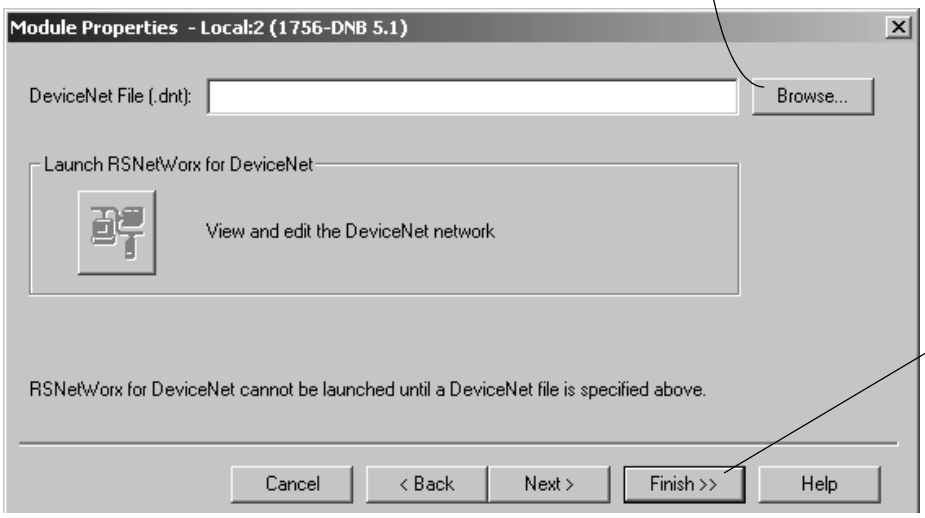
1. Specify the general properties (name, slot, sizes, etc.).

2. Choose *Next*.



3. Choose *Next*.

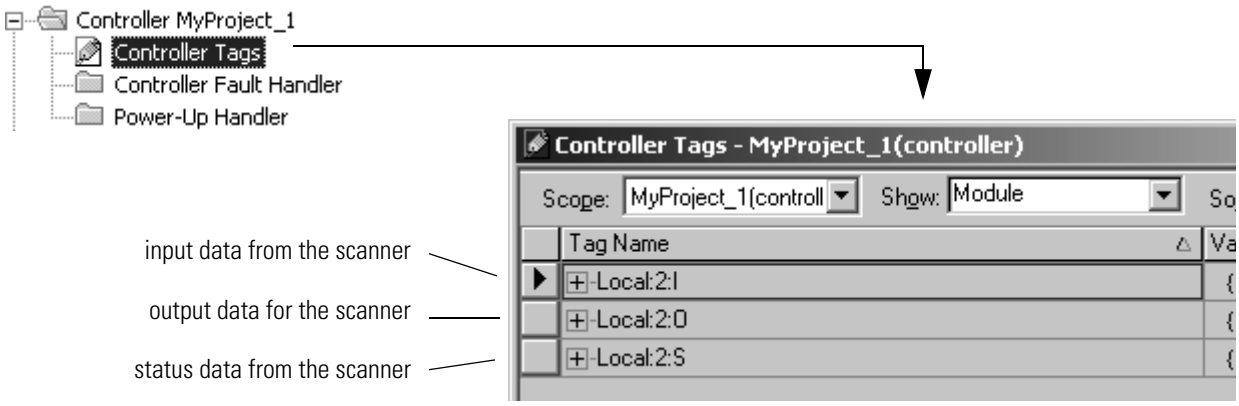
4. Choose *Browse* and find the RSNetWorx configuration file for the network (.dnt file). The default path for the file is …\Program Files\Rockwell Software\RSNetWorxII\Networks.



5. Choose *Finish*.

Determine the Address of DeviceNet Data

When you add the scanner to the I/O configuration of the controller, RSLogix 5000 software automatically creates a set of tags for the input, output, and status data of the network:



The tags for your DeviceNet data follow this format:

The scanner memory uses this format:

slot	*type*	.Data	*[element]*	*.bit*

Which is this tag in the controller

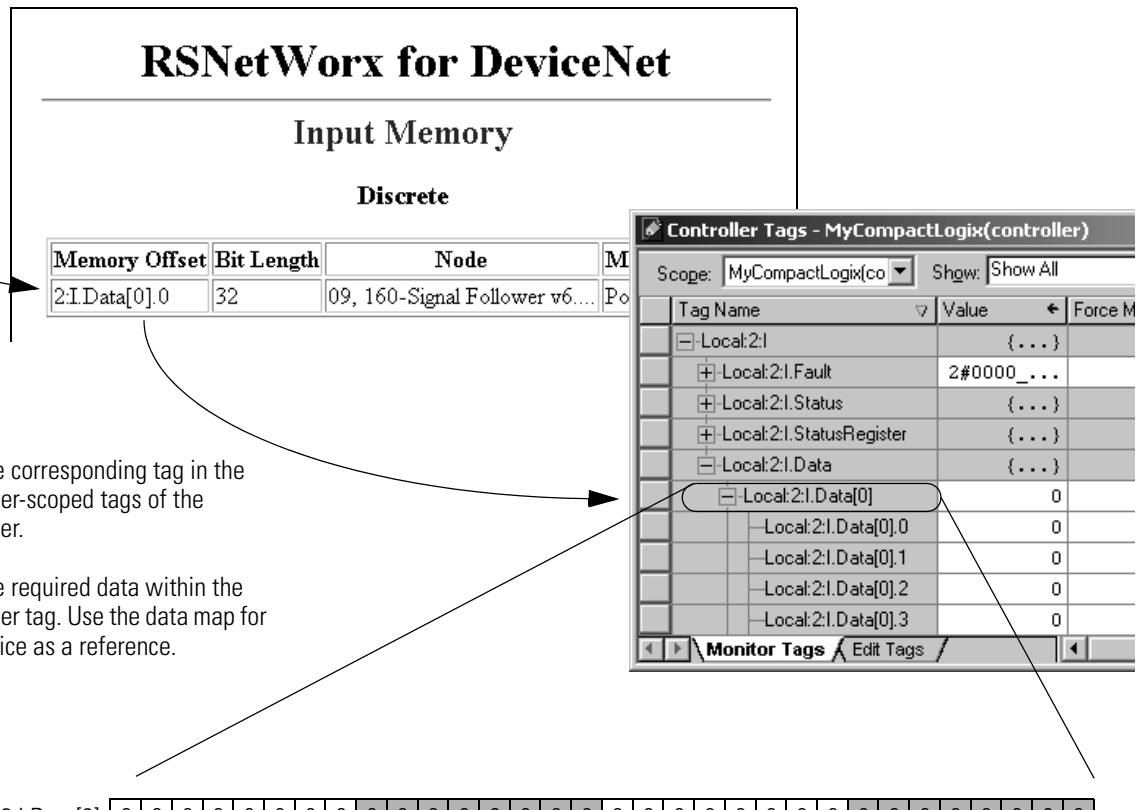
location	*:type*	.Data	*[element]*	*.bit*

= Optional

Where:	**Is:**	
slot	slot number of the scanner	
location	**If you have this scanner:**	**Then location is:**
	local ControlLogix 1756-DNB	Local:*slot_number_of_scanner*
	remote ControlLogix 1756-DNB	*name_of_remote_bridge*:*slot_number_of_scanner*
	CompactLogix 1769-SDN	Local:*slot_number_of_scanner*
	SoftLogix5800 1784-PCIDS	Local:*slot_number_of_scanner*
	DriveLogix/FlexLogix 1788-DNBO	name of the scanner in the I/O configuration of the controller
	Linking Device 1788-EN2DN or 1788-CN2DN	name of the linking device in the I/O configuration of the controller
type	**If the data is:**	**Then type is:**
	input from a device	I
	output to a device	O
	status of the network	S
element	specific DINT (DWord, 32-bit integer) within the array	
bit	specific bit within an integer	

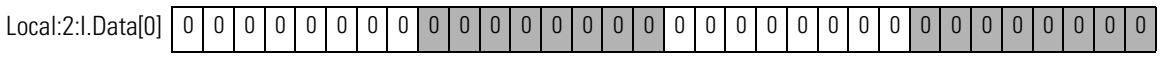
To determine the tag name (address) for DeviceNet data:

1. On the report for the network, find the memory address for the input or output data of the device.



2. Find the corresponding tag in the controller-scoped tags of the controller.

3. Find the required data within the controller tag. Use the data map for the device as a reference.



data map for Bulletin 160 AC drive

Instance 70 Data Format (Basic Speed Control Input Assembly)								
Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0						Running1		Faulted
1								
2	Speed Actual RPM (Low Byte)							
3	Speed Actual RPM (High Byte)							

If You Have a SoftLogix5800 Controller

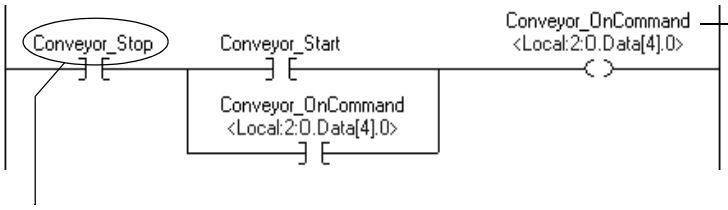
The SoftLogix5800 scanner 1784-PCIDS organizes input and output memory in 16-bit words. It uses the following address format:

word.bit

Where:	Is:
word	INT (16-bit integer) with the memory of the scanner
bit	specific bit within an integer

Program Your Logic With Alias Tags

While you can use the input and output tags of the scanner directly in your logic, it is a lot easier to use alias tags.

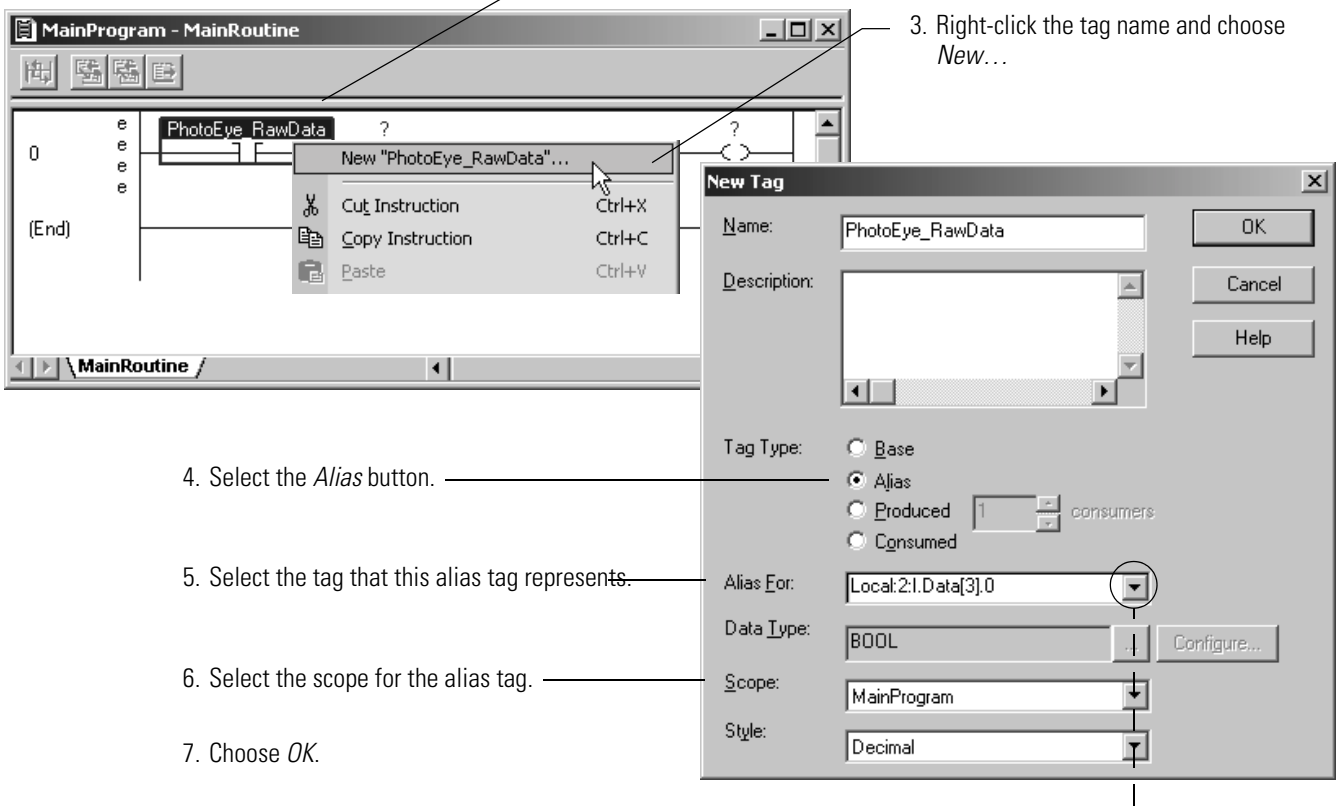


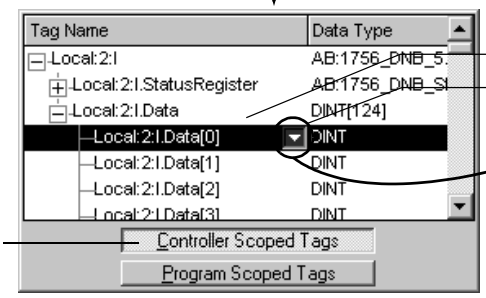
As an option, create tags that describe each device without pointing them to the actual addresses of the devices. Later, convert the tags to aliases for the data of the devices.

alias tag – a tag that represents another tag

- Both tags share the same data.
- When the data changes, both tags change.
- An alias tag provides a descriptive name for data, such as DeviceNet input or output data.
- If the location of the data changes, simply point the alias tag lets to the new location without editing your logic.

1. Enter your logic.
2. Type a descriptive tag name for the DeviceNet data.
3. Right-click the tag name and choose *New…*
4. Select the *Alias* button.
5. Select the tag that this alias tag represents.
6. Select the scope for the alias tag.
7. Choose *OK*.





Look in the controller-scoped tags.

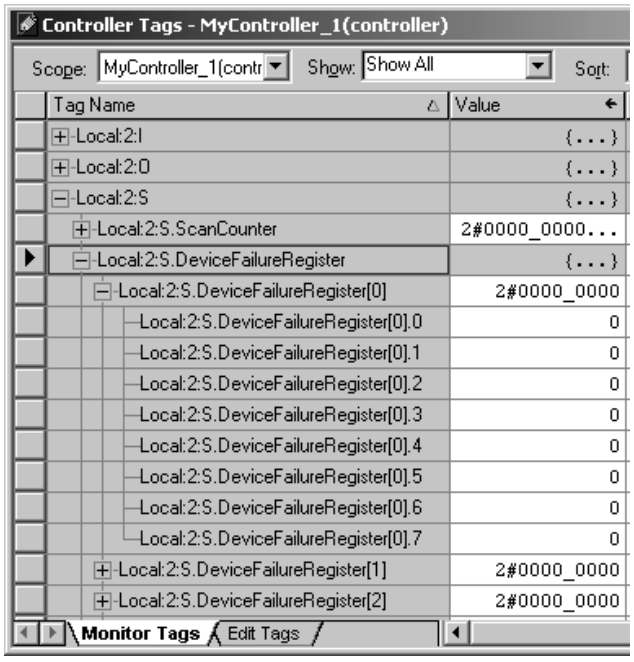
Select the address of the data.

To select a bit, click the ▼.

0	1	2	3	4	5	6	7
8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23
24	25	26	27	28	29	30	31

Determine If a Device Has Failed

If a DeviceNet device stops communicating (device failure, cable break, etc.), the tag for the device stays at its last value. To make sure that your input data is valid, we recommend that you buffer the input data and examine the device failure register.



Indication that a device has failed.
- There is 1 bit for each address on the DeviceNet network.
- If a bit = 1, then the device at that address has failed.

Addresses 0 to 7

Address 0

Address 1

Addresses 8 to 15

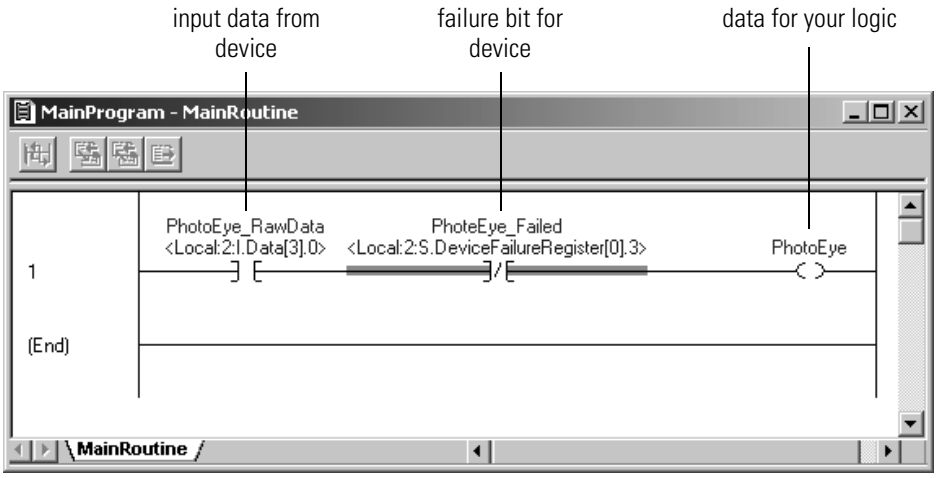
On every scan of the controller, execute logic similar to the following:

If PhotoEye_RawData = 1 and PhotoEye_Failed = 0 then

PhoteEye = 1

Otherwise PhoteEye = 0

Use the PhotoEye tag in the rest of your logic (not PhotoEye_RawData).



Place the Scanner in Run Mode

To run the DeviceNet network:

1. Set the following bit of the output structure for the scanner:

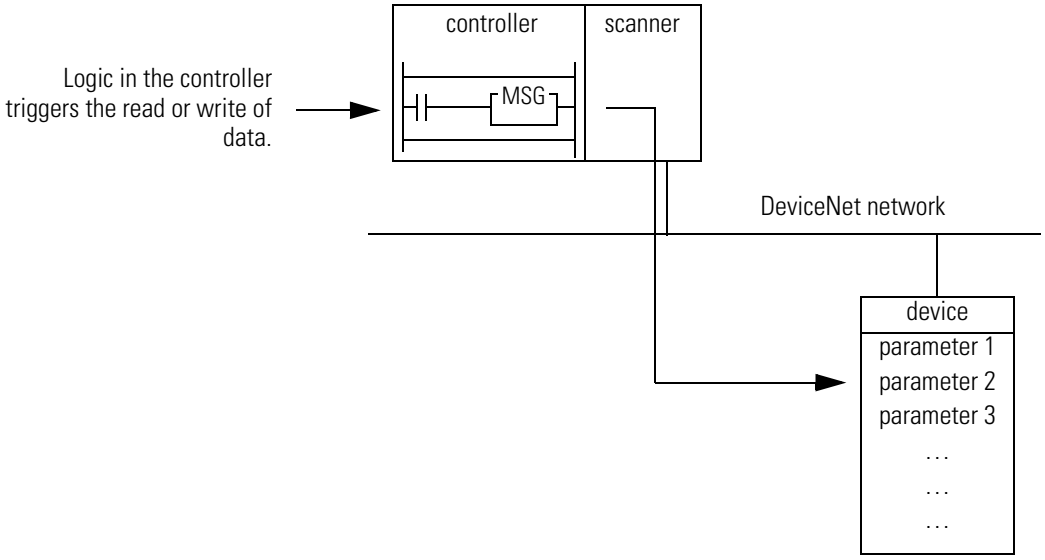
To put the scanner in run mode, turn on this bit. →

If you want to:	The set this bit:	To:
run the network	…O.CommandRegister.Run	1
not run the network (idle mode)	…O.CommandRegister.Run	0
fault the network	…O.CommandRegister.Fault	1
not fault the network	…O.CommandRegister.Fault	0
disable the network	…O.CommandRegister.DisableNetwork	1
enable the network	…O.CommandRegister.DisableNetwork	0
halt the scanner (ceases all operation)	…O.CommandRegister.HaltScanner	1
unhalt the scanner	…O.CommandRegister.HaltScanner	0
reset the scanner	…O.CommandRegister.Reset	1
resume operation after a reset	…O.CommandRegister.Reset	0

2. Place the controller in run/remote run mode.

When to Use a MSG Instruction

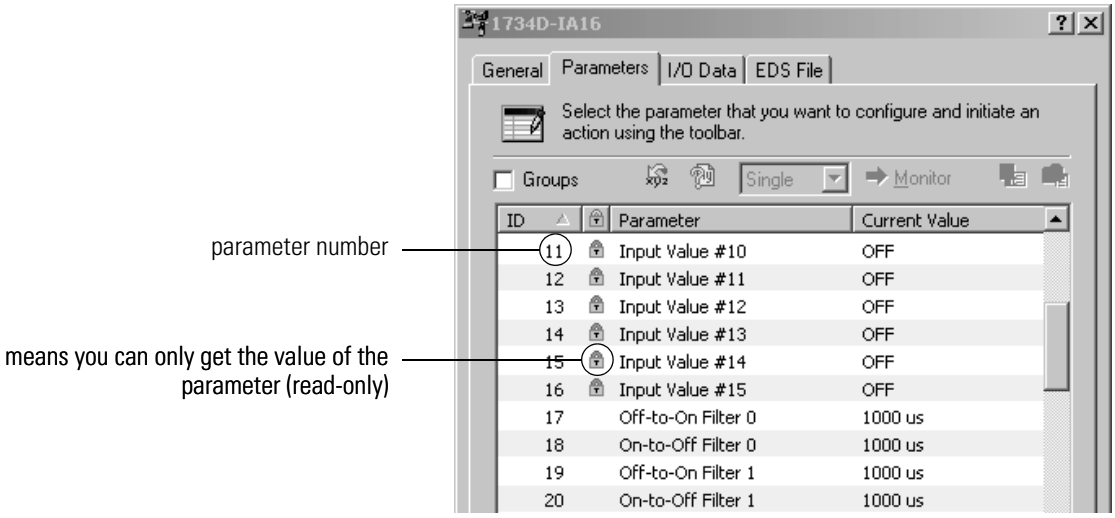
If you want to set or get a parameter based on conditions in your logic, use a Message (MSG) instruction in ladder logic to access the parameter.



Some parameters *do not* require ongoing updates. For example, initializing configuration parameters may occur only when the controller goes to run mode. By using a MSG instruction for those parameters, you save bandwidth on the DeviceNet network for more critical or ongoing data.

Determine the Parameter Number to Access

In RSNetWorx software, determine the parameter number that you want to access:

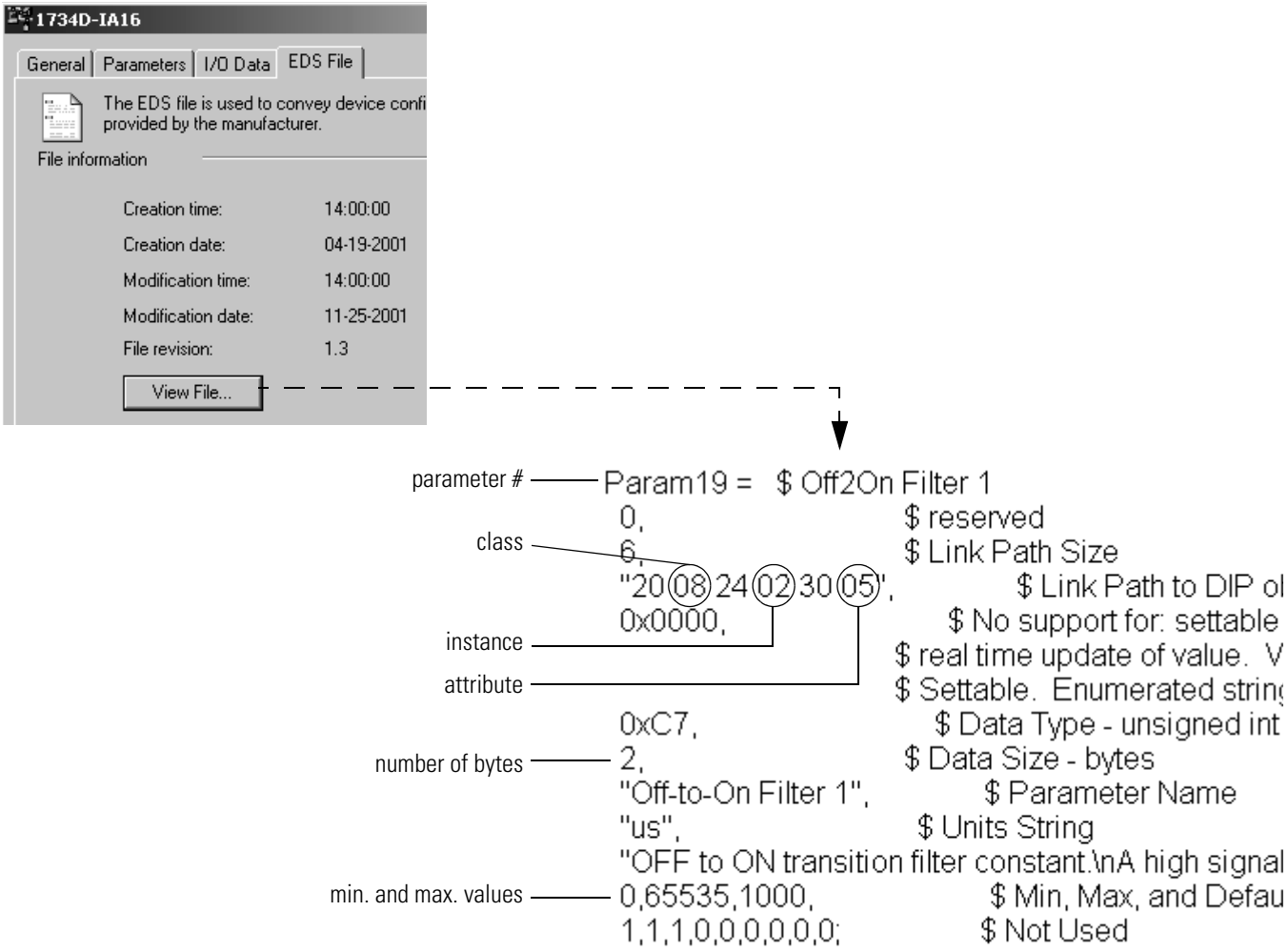


Determine the Configuration of the Parameter

To get or set a parameter, find the following information about the parameter:

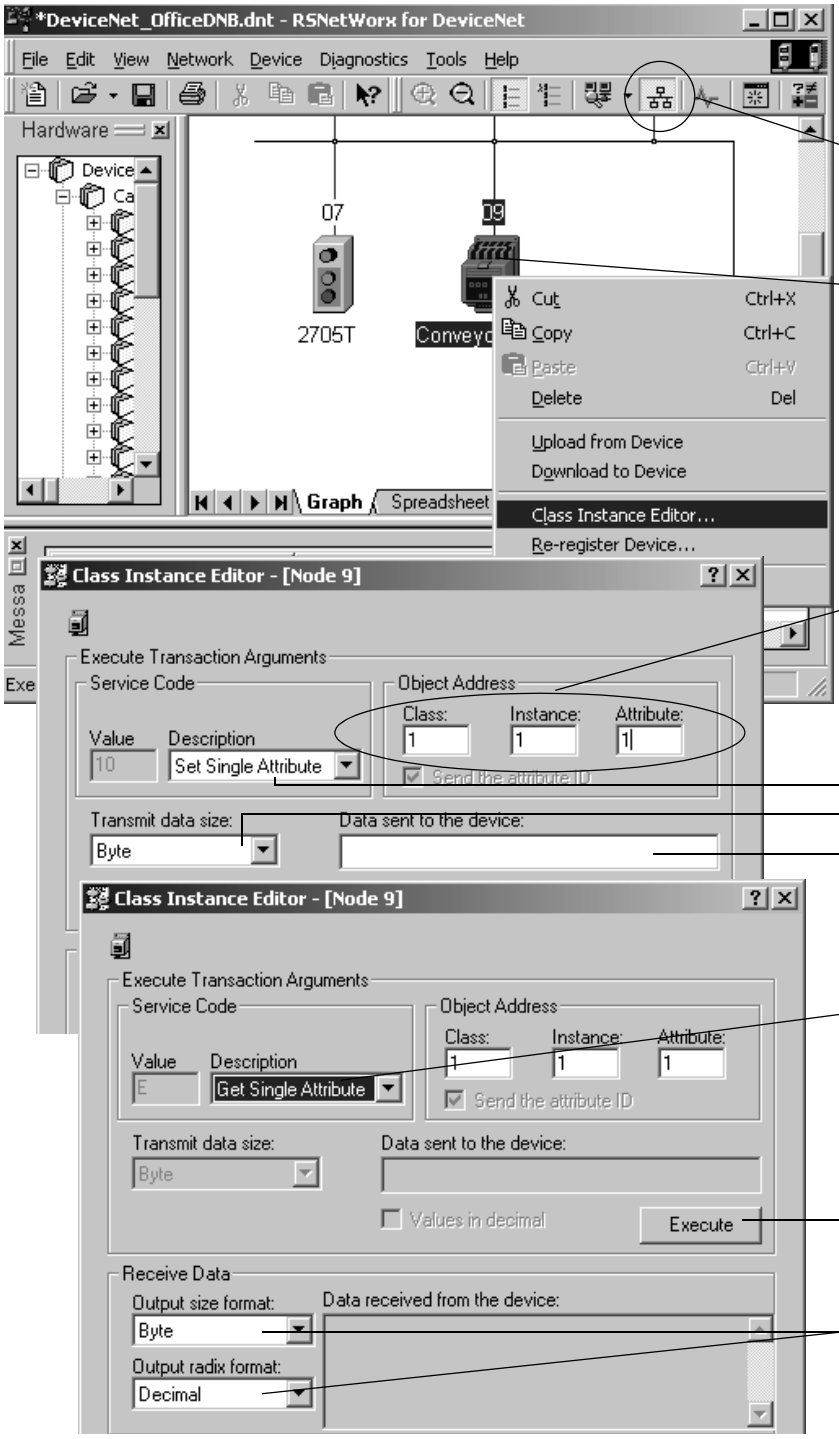
Item:	Value:
class # (hex)	
instance # (hex)	
attribute # (hex)	
number of bytes (size)	
minimum value	
maximum value	
decimal places (Some devices assume a specific number of decimal places in a value.)	

In addition to the documentation for the device, the EDS file may also give you the required information:



Test the Parameter

A simple way to make sure that you have the correct configuration for a parameter (data size, values, etc.) is to use the Class Instance editor in RSNetWorx software.

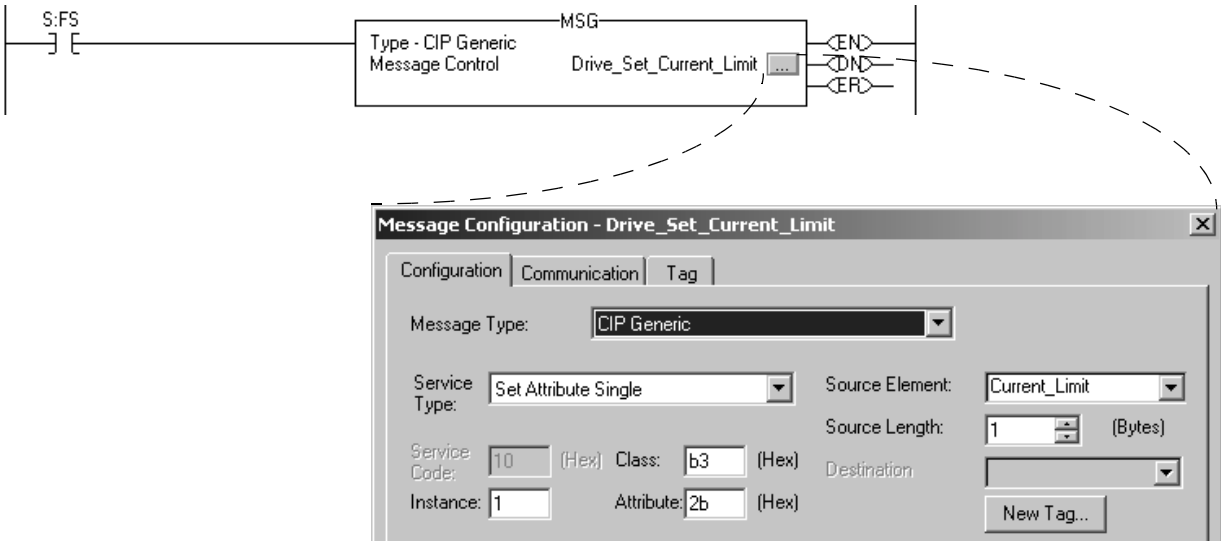


1. In RSNetWorx software, go online to your DeviceNet network.
2. Right-click the device and choose *Class Instance Editor*.
3. Type the class, instance, and attribute for the parameter.
4. To change the parameter:
   a. Choose *Set Single Attribute*.
   b. Select the number of bytes.
   c. Type the new value in hexadecimal format.
5. To read the parameter, choose *Get Single Attribute*.
6. Choose *Execute*.
7. To change how output data is displayed, select the size and format.

Enter Message Logic

To access a parameter of a device (get or set the parameter), configure the MSG instruction as CIP Generic.

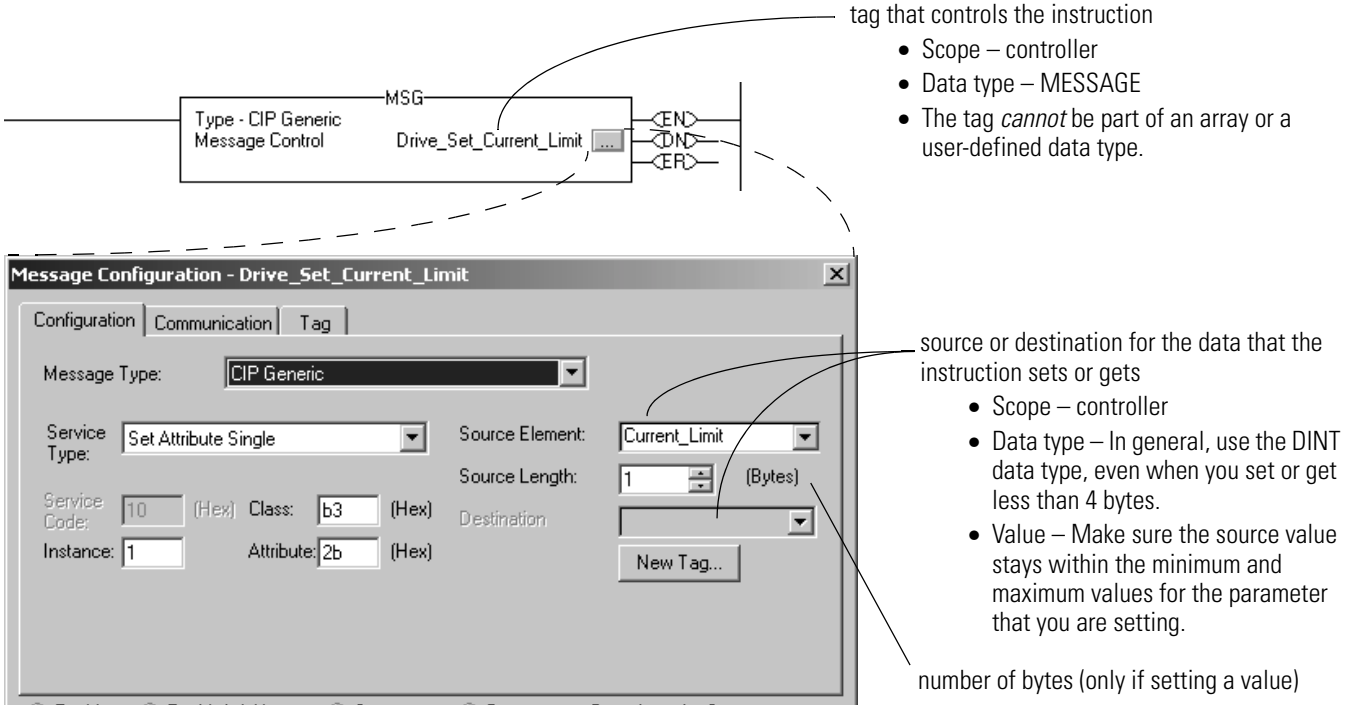
Change the current limit of the drive



To configure the MSG instruction:

Step:	See page:
❑ Define the Source or Destination Data	7-17
❑ Enter and Configure the MSG Instruction	7-18
❑ Set the Communication Path	7-19

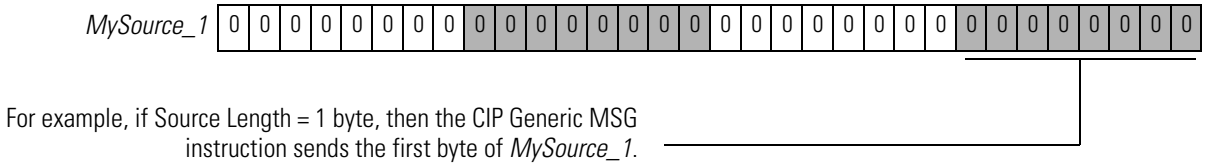
Define the Source or Destination Data



In general:

- Use the DINT data type for the source or destination tag, even when you set or get less than 4 bytes.
- Make sure the source value stays within the minimum and maximum values for the parameter that you are setting.

When setting a value, the CIP Generic MSG instruction takes only the specified number of bits from the source tag.

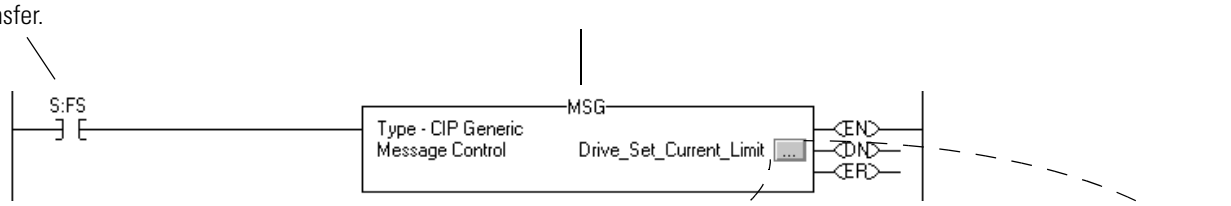


To increase the efficiency of your logic, minimize the use of SINT or INT data types. Whenever possible, use the DINT data type for integers.

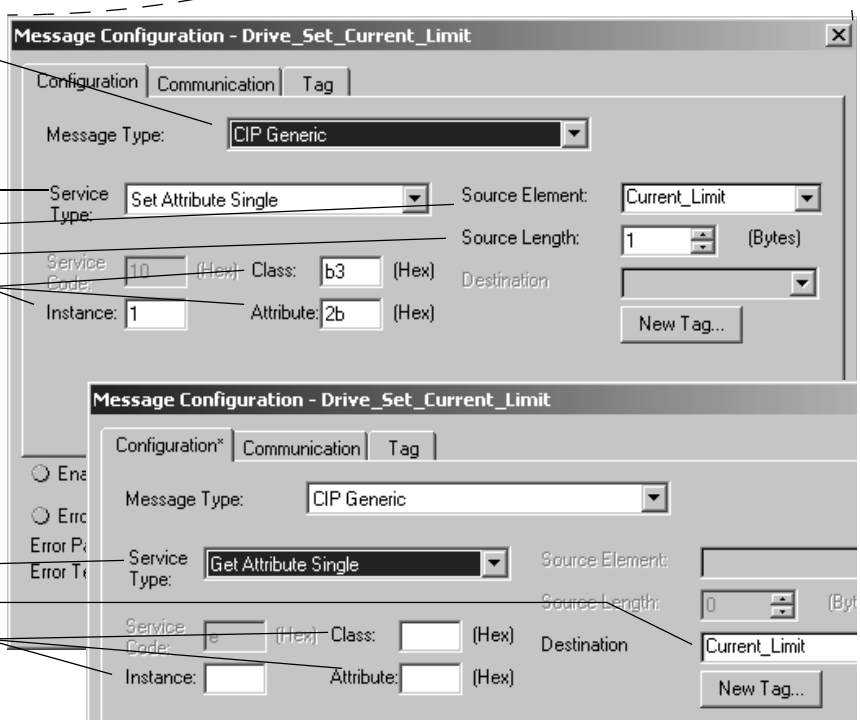
- A Logix5000 controller typically compares or manipulates values as 32-bit values (DINTs or REALs).
- The controller typically converts a SINT or INT value to a DINT or REAL value before it uses the value.
- If the destination is a SINT or INT tag, the controller typically converts the value back to a SINT or INT value.
- The conversion to or from SINTs or INTs occurs automatically with no extra programming. But it takes extra execution time and memory.

Enter and Configure the MSG Instruction

1. Enter the condition for the data transfer.
2. Enter the MSG instruction.



3. Select *CIP Generic*.
4. To change a parameter:
   a. Select *Set Attribute Single*.
   b. Select the tag that has the new value.
   c. Type the number of bytes
   d. Type the class, instance, and attribute for the parameter, in hex.
5. To read a parameter:
   a. Choose *Get Attribute Single*.
   b. Select the tag to store the value.
   c. Type the class, instance, and attribute for the parameter, in hex.



Set the Communication Path

The communication path specifies the route to the device. A communication path follows this format:

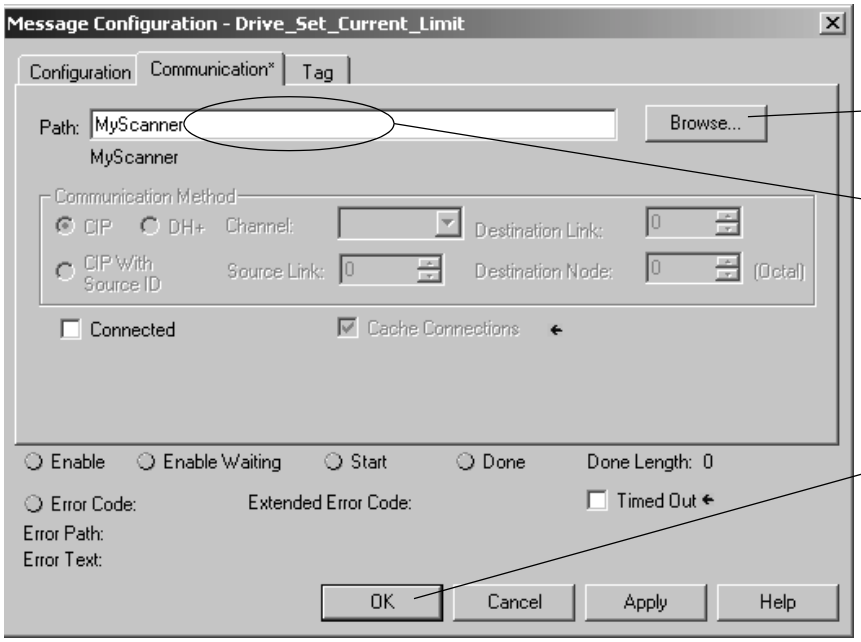
scanner_name,2,*device_address*

Where:	Is:
scanner_name	Name of the scanner in the I/O Configuration folder of the controller.
device_address	Address of the device on the DeviceNet network.

For example: If the name of the scanner is *MyScanner* and the device is at address 3, then the path is:

MyScanner,2,3

To set the path:



1. Click the *Communication* tab.
2. Click the Browse button and select the scanner.
3. Type the rest of the path.
4. Close the dialog box.

Typically, a CIP generic MSG instruction requires no connection to transfer its data.

This type of message:	Using this communication method:	Uses a connection:
CIP data table read or write	CIP	yes
PLC2, PLC3, PLC5, or SLC (all types)	CIP	no
	CIP with Source ID	no
	DH+	yes
CIP generic	CIP	your choice[1]
block-transfer read or write	na	yes

(1) You can connect CIP generic messages, but for most applications we recommend you leave CIP generic messages unconnected.

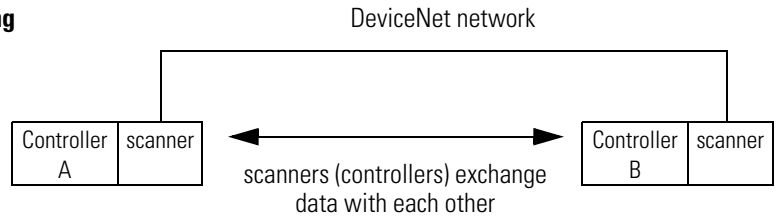
For more information on programming MSG instructions, see the *Logix5000 Controller General Instructions Reference Manual*, publication 1756-RM003.

Interlock and Share Inputs

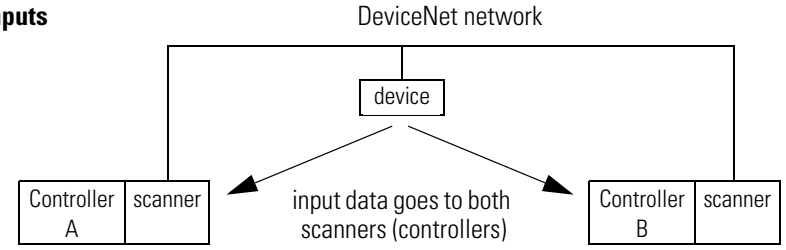
How to Use This Chapter

The chapter describe how to interlock and share inputs over a DeviceNet network.

Interlocking



Sharing Inputs

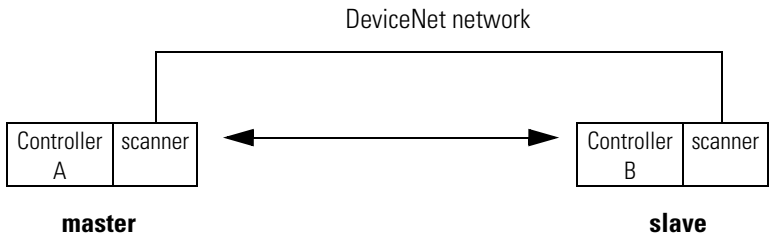


Interlock

To set up an interlock between 2 controllers over a DeviceNet network:

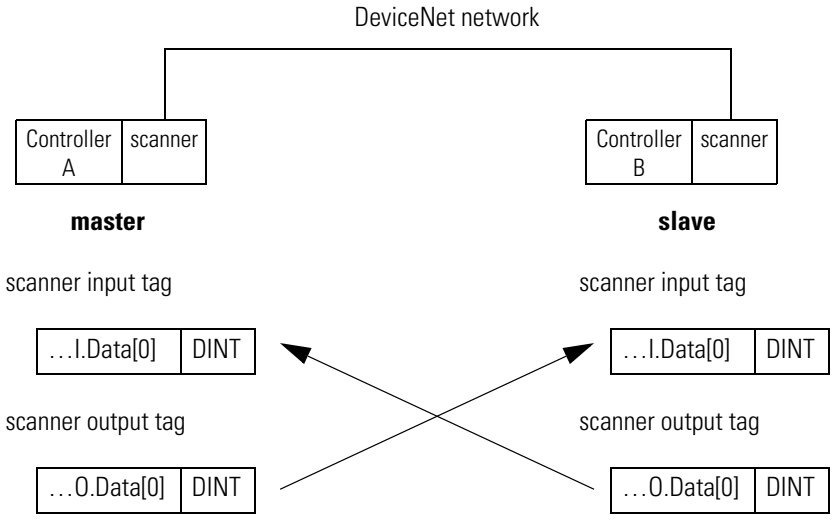
Choose a Master Controller

To interlock, choose a controller to serve as the master. The other controller/controllers become a slave/slaves to the master. This is simply defines the relationship between the controllers. The scanners of each controller still scans and controls its own devices, if desired.

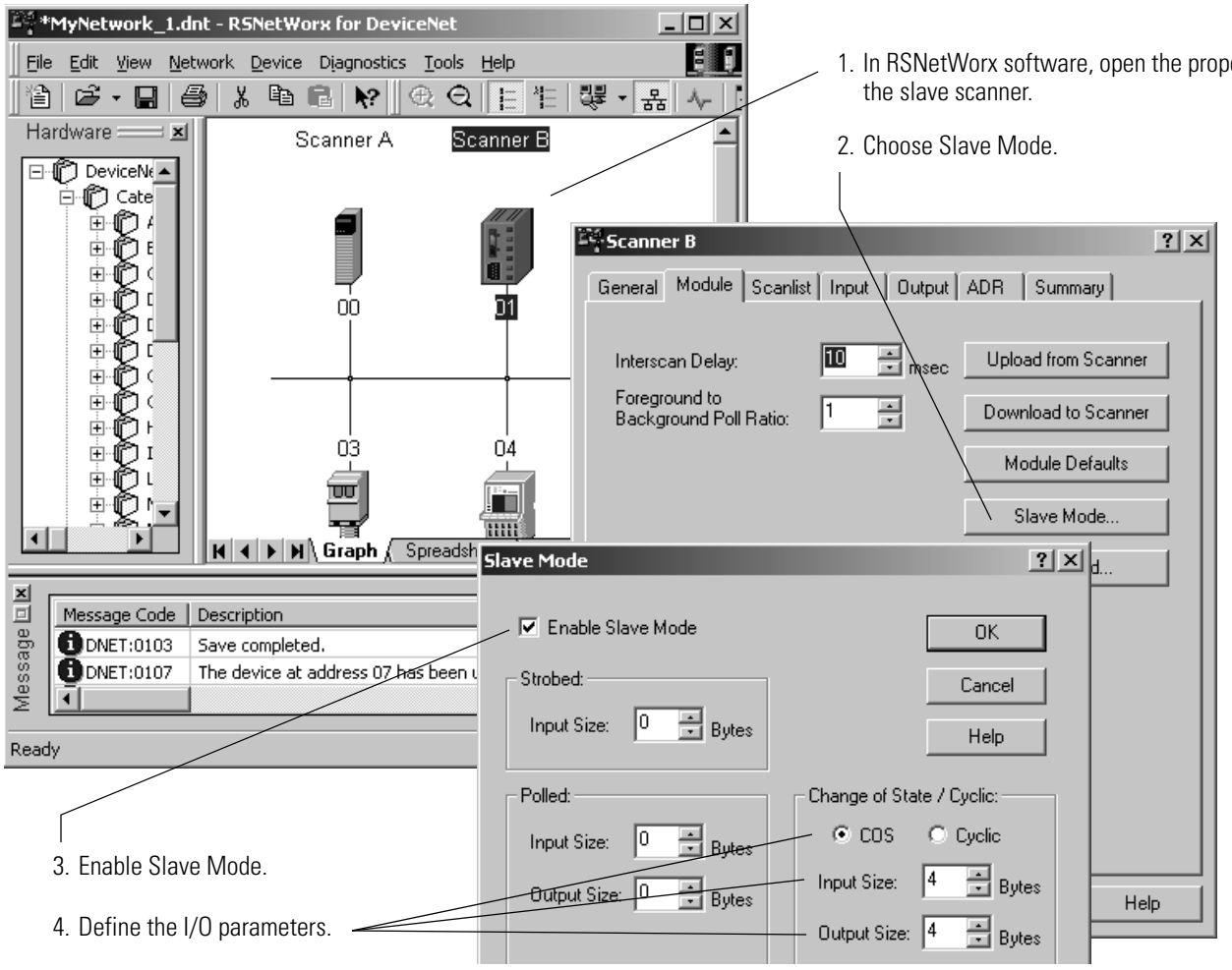


Determine How Much Data to Exchange

Before you configure the scanners for the interlock, determine how much data you want to exchange between the controllers.



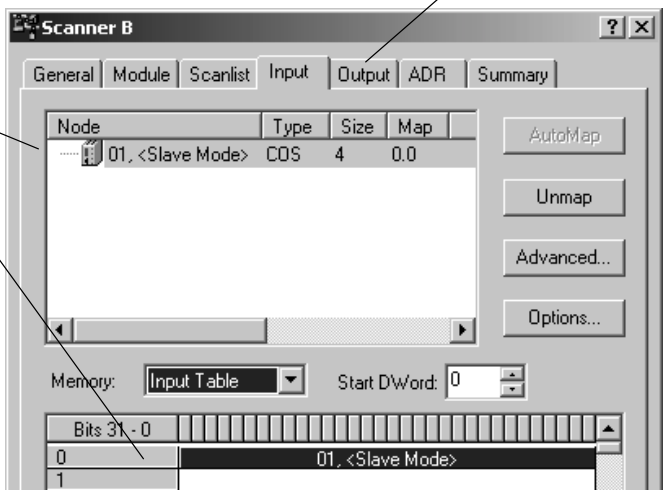
Enable Slave Mode for the Slave Scanner



1. In RSNetWorx software, open the properties for the slave scanner.
2. Choose Slave Mode.
3. Enable Slave Mode.
4. Define the I/O parameters.

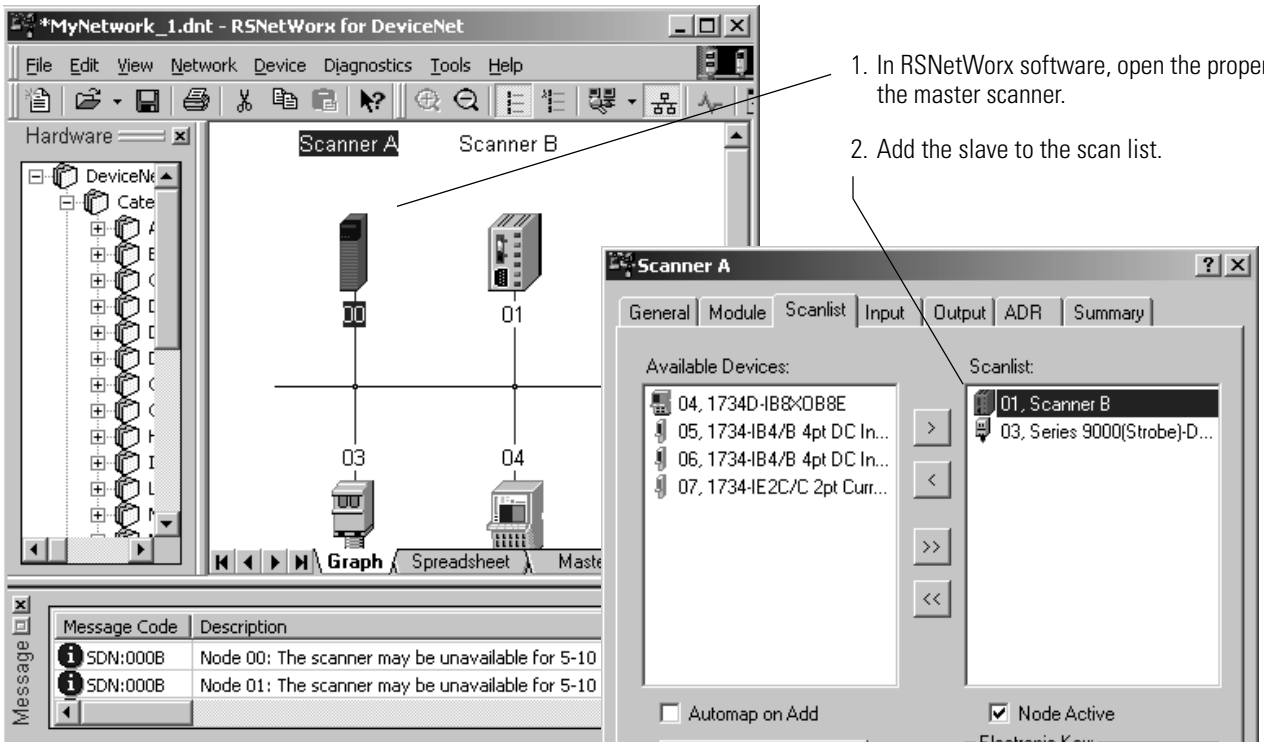
Map the Slave Mode Data

1. Map the slave mode data to the input memory of the slave scanner. This is the data that the scanner (controller) gets from the master.
2. Repeat for the data that the slave scanner (controller) sends to the master.



Add the Slave to the Scan List of the Master

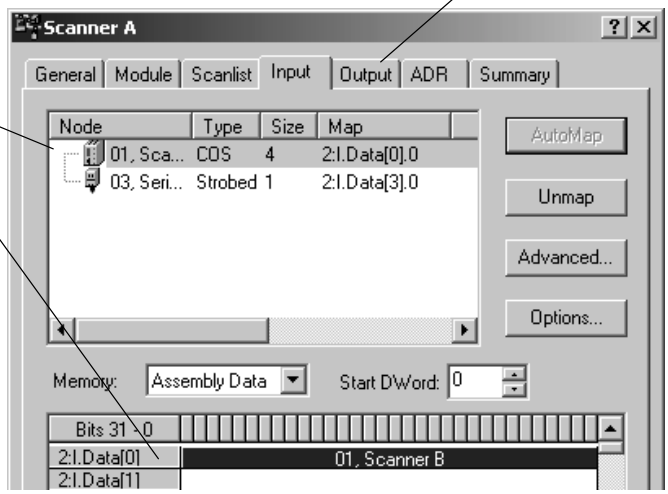
1. In RSNetWorx software, open the properties for the master scanner.
2. Add the slave to the scan list.



Map the Data of the Slave

1. Map the slave scanner to the input memory of the master scanner. This is the data that the scanner (controller) gets from the slave.

2. Repeat for the data that the master scanner (controller) sends to the slave.



Place Both Scanners In Run Mode

To exchange data, place both scanners in run mode. See *Place the Scanner in Run Mode* on page 7-12.

Share Inputs

To let multiple scanners (controllers) consume input data from the same input device:

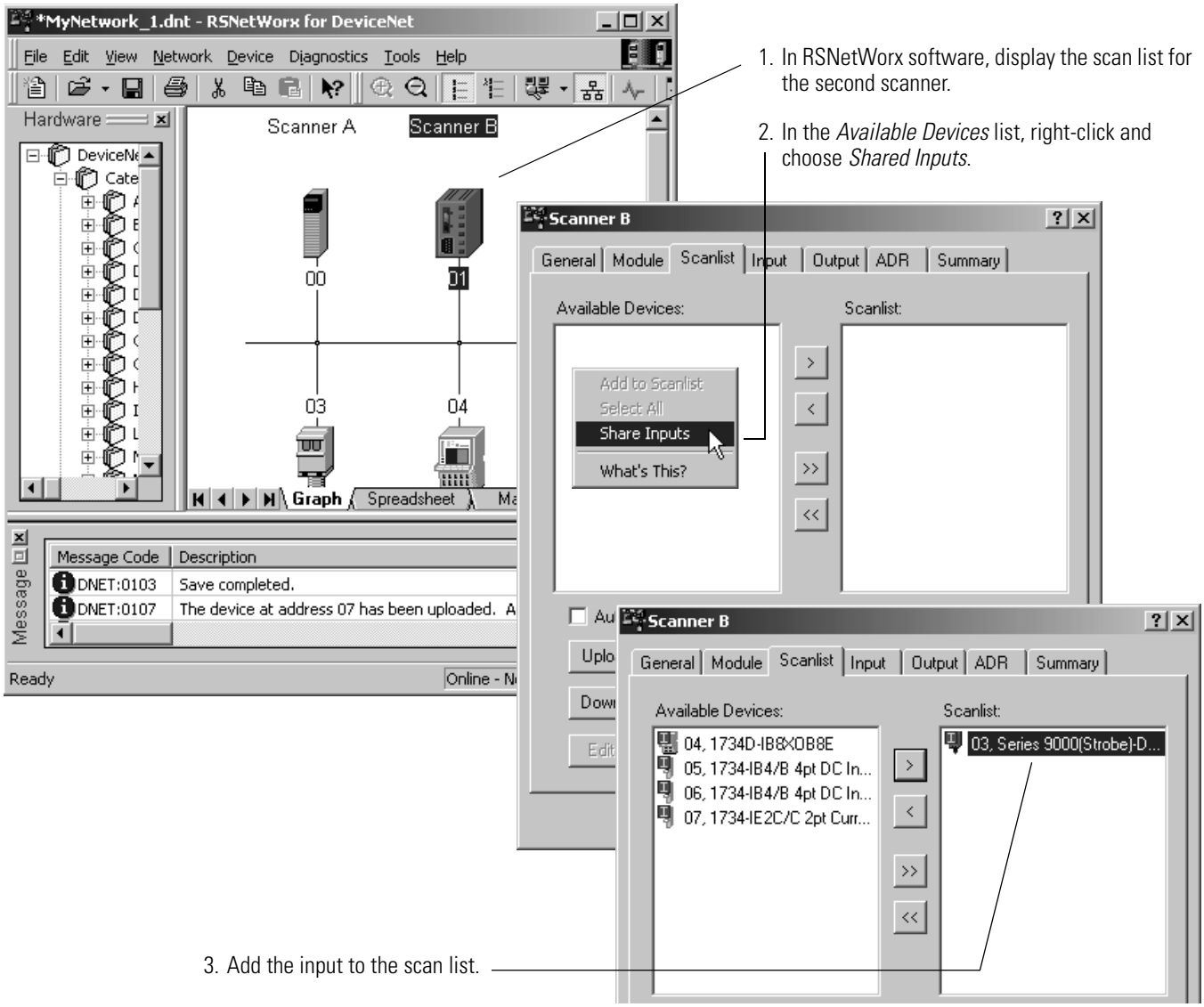
Step:	Page:
❑ Add the Input to the First Scanner	8-5
❑ Add the Input to the Second Scanner	8-6
❑ Map the Input Data in the Second Scanner	8-7

Add the Input to the First Scanner

Establish communication between the input and one of the scanners. See either:

- *Configure Your Network Offline* on page 2-1
- *Configure Your Network Online* on page 6-1

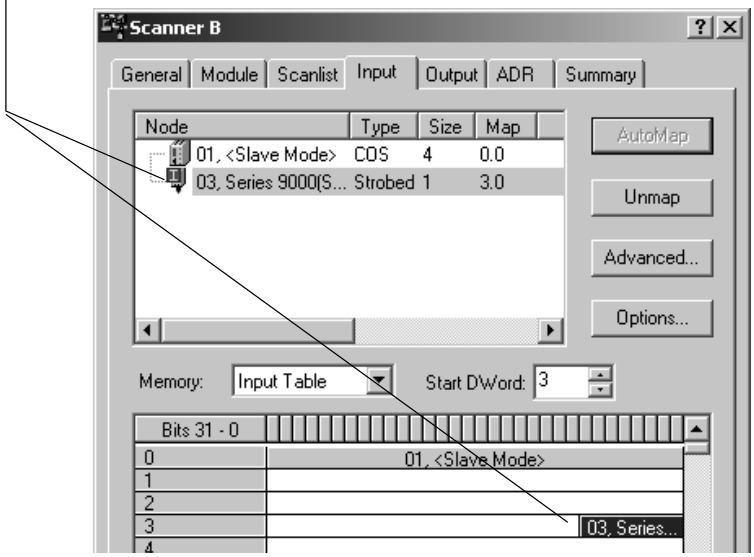
Add the Input to the Second Scanner



1. In RSNetWorx software, display the scan list for the second scanner.
2. In the *Available Devices* list, right-click and choose *Shared Inputs*.
3. Add the input to the scan list.

Map the Input Data in the Second Scanner

Map the input data to the input memory of the second scanner.



Notes:

Communicate with a PanelView™ Standard Terminal

Using This Chapter

This chapter describes how to configure and program communication with a PanelView Standard terminal on a DeviceNet network.

Choose Data Types

For the tags in the PanelView terminal, use the following data types as a starting point.

If the object on the PanelView screen reads or writes:	Then use this data type:	Which uses this many bits in the PanelView terminal:
single bit	bit	1
integer	unsigned integer	16

Data types such as signed integer and float also work with Logix5000 controllers. However they require additional configuration and/or programming.

Choose an Communication Method

You have 3 options to send data to/from a PanelView terminal:

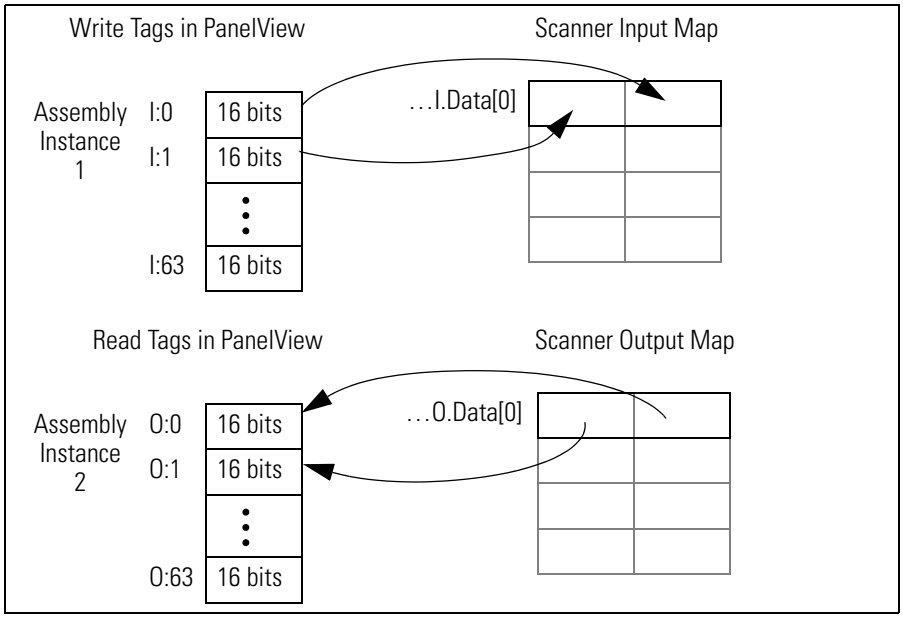
If you want to:	Then use this method:	Notes
communicate with the PanelView terminal using the regular I/O communication of the the DeviceNet network	I/O slave	• Easiest to use—requires *no* additional programming. • Use this as your first choice. • Higher priority on the network than explicit server and explicit client updates.
communicate with the PanelView terminal based on conditions in your logic	explicit server	• Provides additional data when you use up the I/O slave assemblies. • Lower priority on the network than I/O slave updates.
use the PanelView terminal to get or set a parameter of a device on your DeviceNet network (not a controller)	explicit client	• *Does not* use the controller or scanner. • Lower priority on the network than I/O slave updates

I/O Slave Communication

I/O Slave

Scanner polls PanelView Terminal for I/O data

- You define the input and output sizes, up to 64 words.
- Assembly instance 1 gives input data to the controller.
- Assembly instance 2 gets output data from the controller.

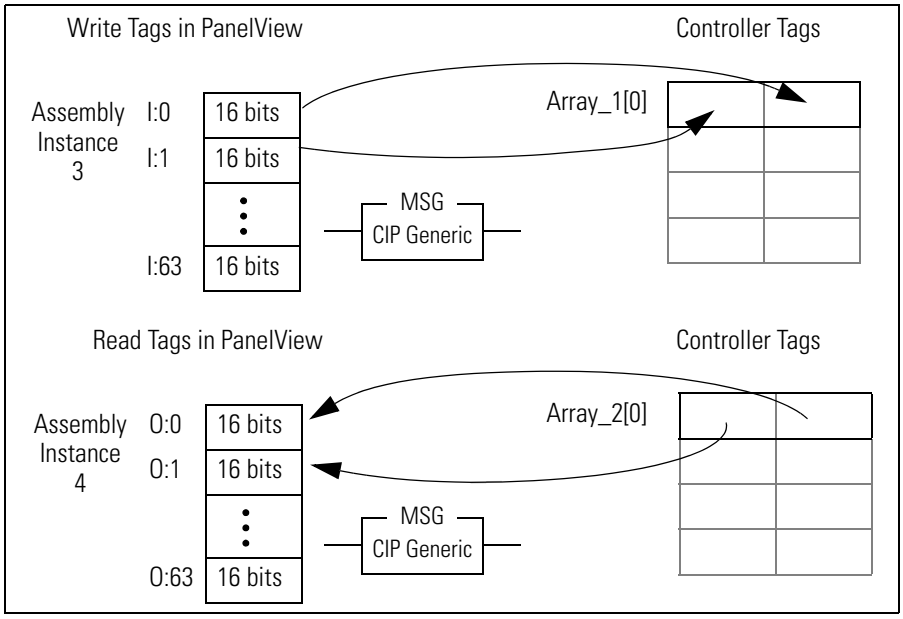


Explicit Server Communication

Explicit Server

Controller executes a MSG instruction that gets or sets data in the PanelView terminal.

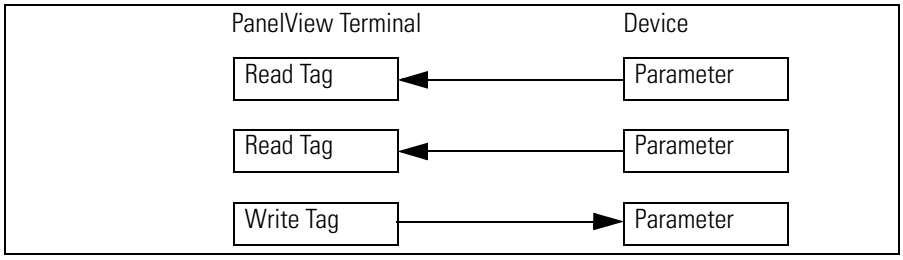
- 14 assembly instances are available for explicit - server transfers.
- Instance #s are 3 to 16.
- You define an instance as either input data (I) or output data (O) but not both.
- Each instance provides 64 words of either input or output data for the terminal.



Explicit Client Communication

Explicit Client

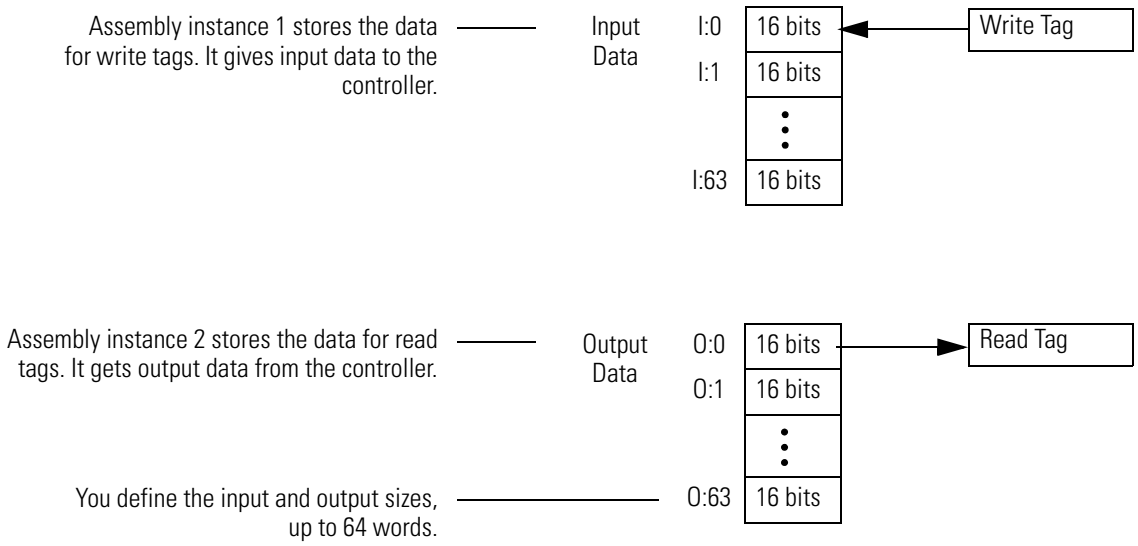
PanelView terminal sets or gets data in another device on a tag-by-tag basis.



Plan and Configure I/O Slave Tags

Like the other DeviceNet devices, I/O slave tags use space in the input and output maps of the scanner. The scanner gets/sets the data on each scan of the DeviceNet network.

A PanelView terminal gives you 2 blocks of 16-bit words (assembly instances) for I/O slave tags:



To set up I/O slave tags:

Step:	See page:
❑ Use a Word/Bit Format for Each Tag	9-5
❑ For Integers, Skip Every Other Word	9-5
❑ Configure an I/O Slave Tag	9-6

Use a Word/Bit Format for Each Tag

Each I/O slave tag requires a specific address in the corresponding assembly instance. A tag address follows this format:

Type	*:Word*	*/Bit*

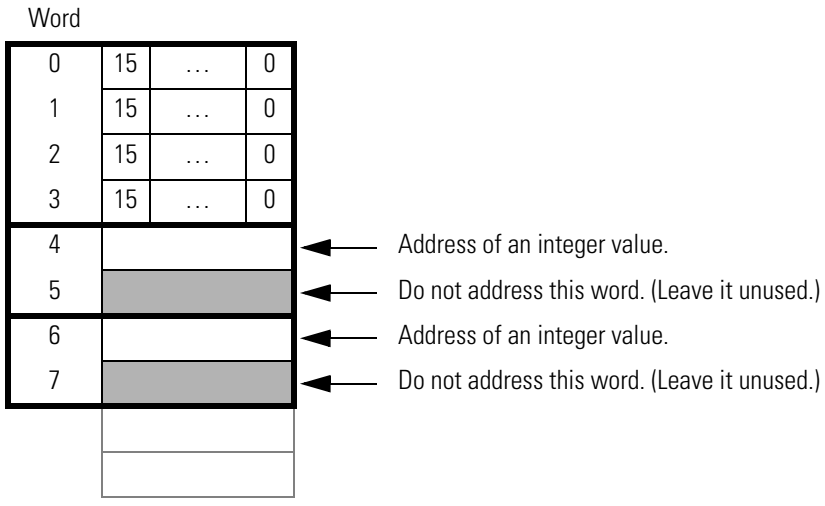
= Optional

Where:	**Is:**	
Type	Type of tag	
	If the tag is a:	**Then use:**
	write tag (sends input data to the controller)	I
	read tag (gets output data from the controller)	O
Word	Specific 16-bit word within the assembly	
Bit	Specific bit within *Word* (0 - 15)	

For Integers, Skip Every Other Word

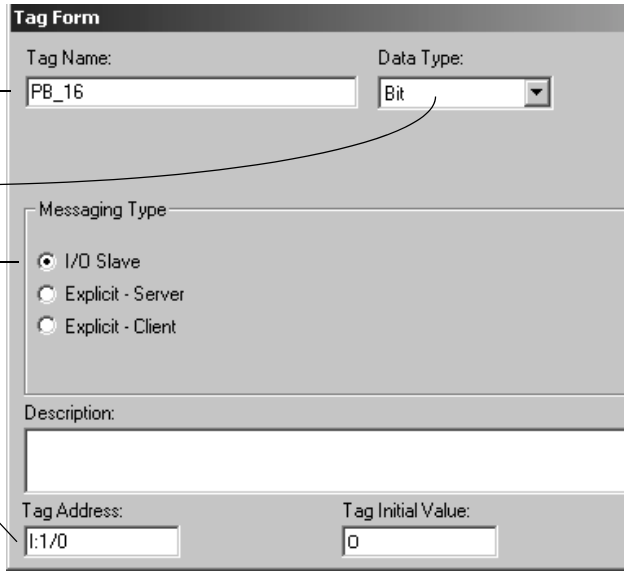
Logix5000 controllers use 32-bit integers (DINTs). To make your programming easier, lay out your PanelView tags as follows:

1. For bit-level tags, set aside an even number of words.
2. For each integer, set aside 2 words. Start each integer on an even word. This lets each integer map to its own element in the scanner/controller.



Configure an I/O Slave Tag

1. Type a descriptive name for the tag.
2. Select the data type for the tag.
3. Let the scanner update the data.
4. Assign an address for the tag within the input or output assembly.

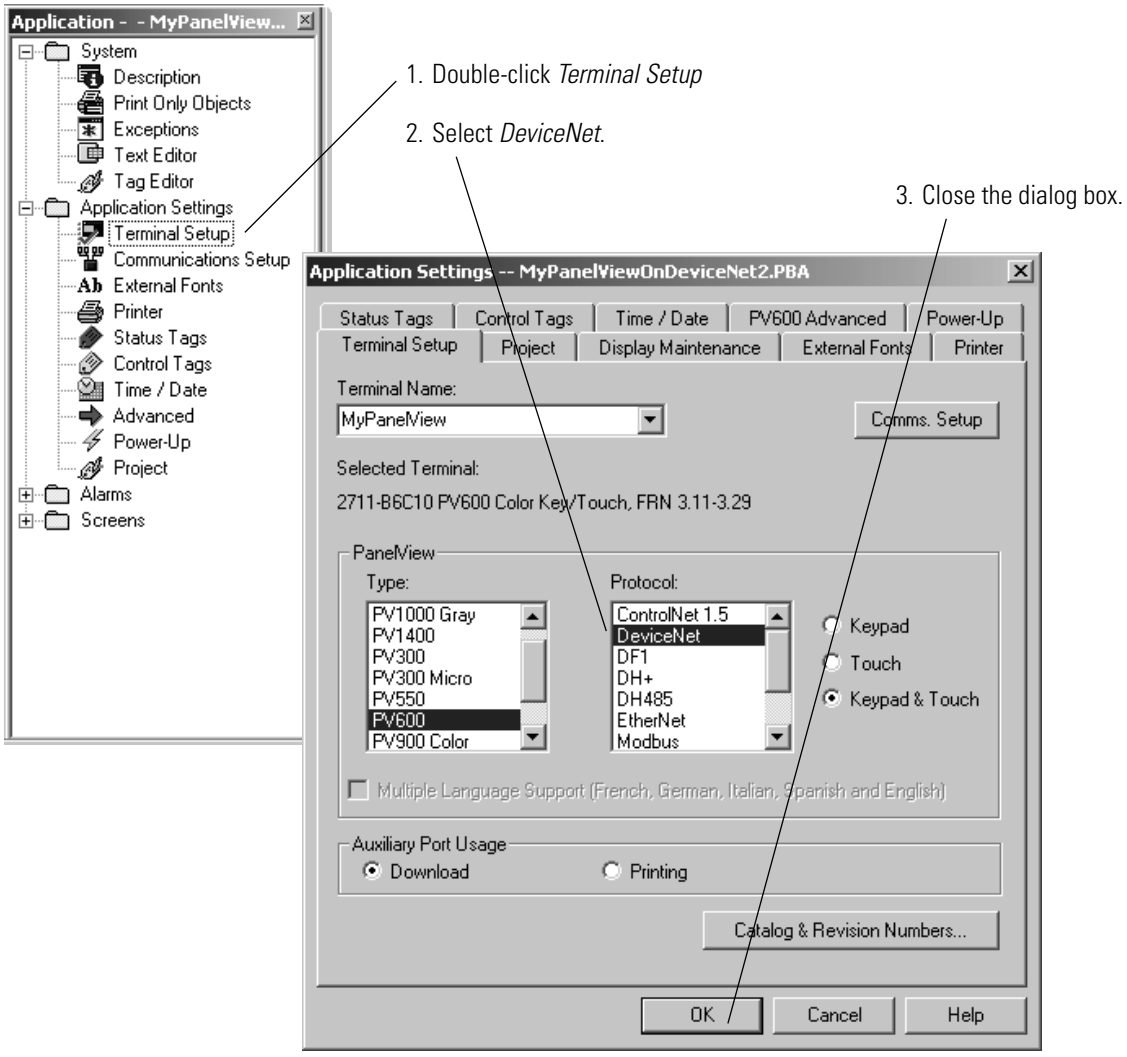


Set Up the Terminal on the Network

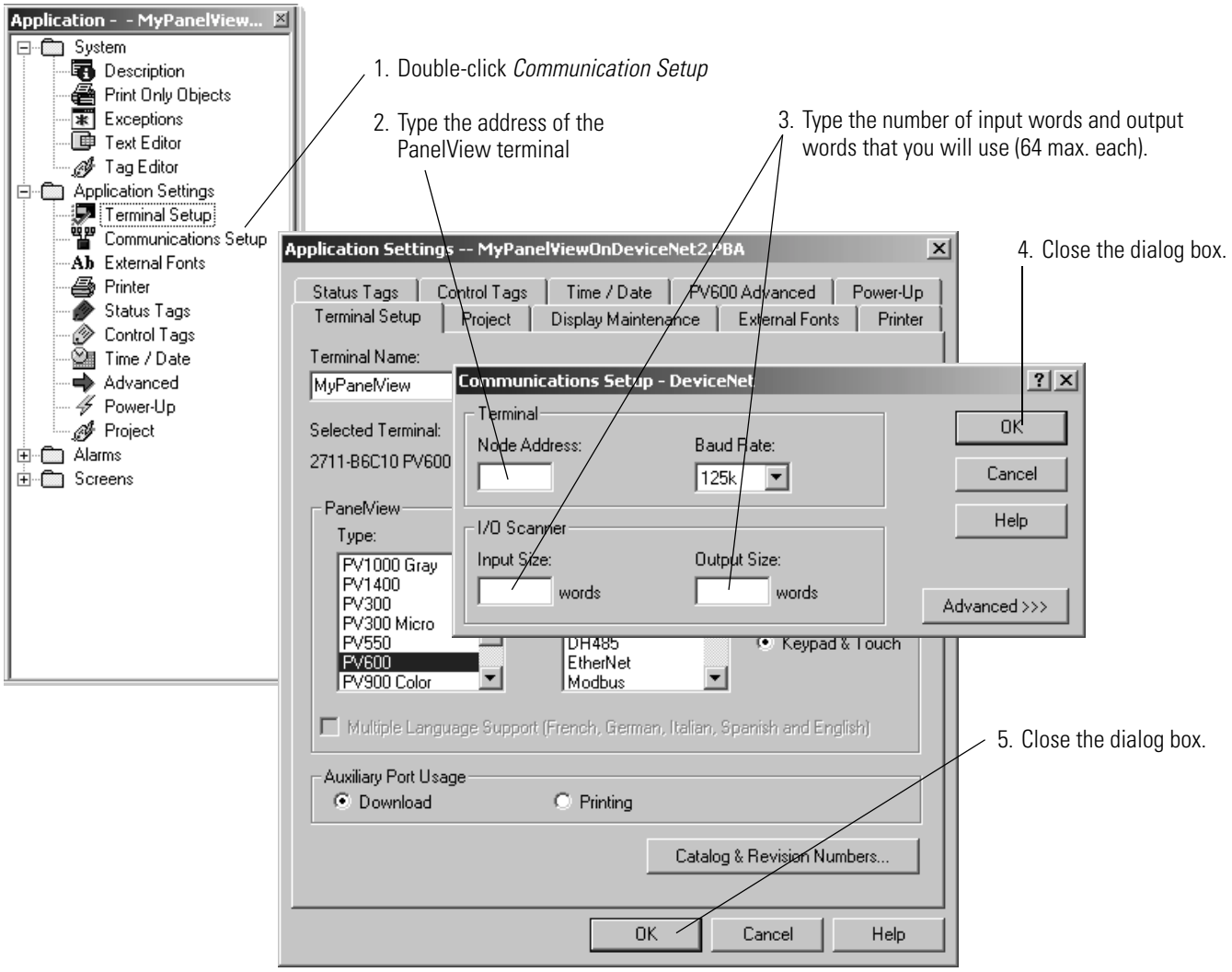
To configure a PanelView terminal for communication on a DeviceNet network, complete the following steps in PanelBuilder32 software:

Step:	See page:
❑ Set the Protocol	9-7
❑ Set the Network Address and I/O Sizes	9-8

Set the Protocol



Set the Network Address and I/O Sizes



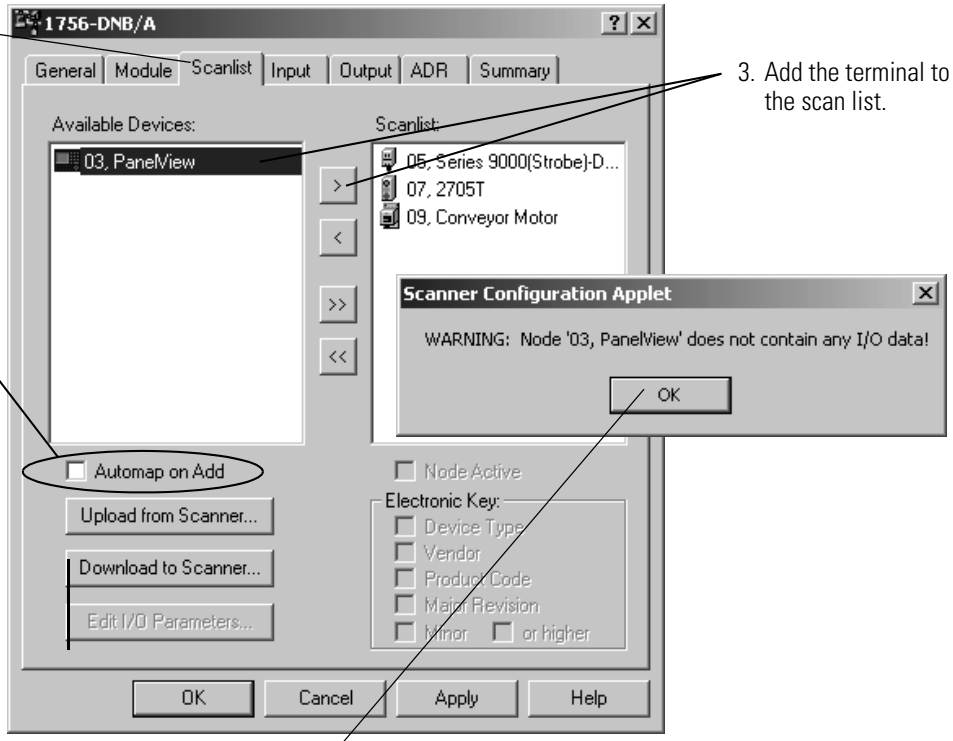
Configure the Scanner to Update I/O Slave Tags

To access I/O slave tags, map the data to the input and output maps of the scanner.

Step:	See page:
❑ Add the Terminal to the Scan List	9-9
❑ Edit I/O Parameters	9-10
❑ Map Input and Output Data	9-10

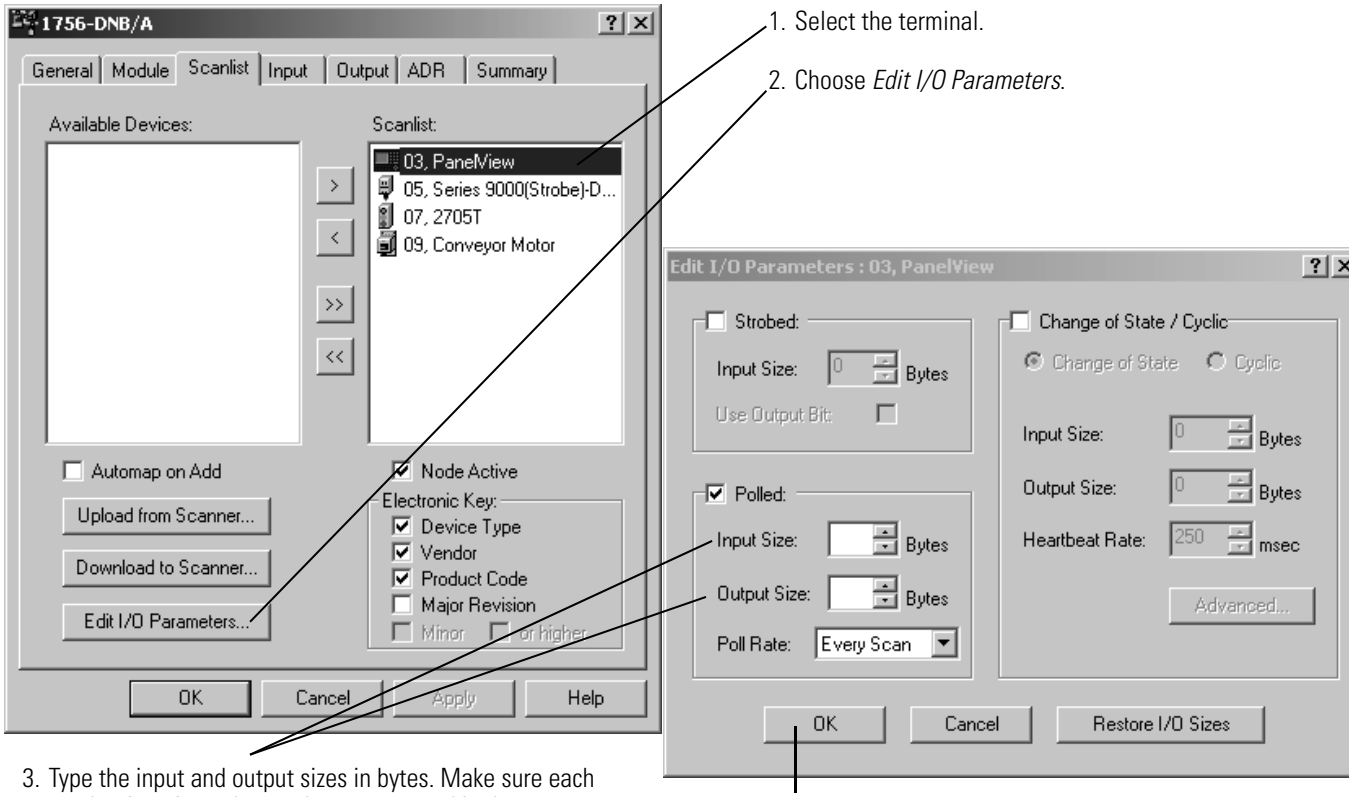
Add the Terminal to the Scan List

1. Click the *Scanlist* tab
2. Clear the *Automap on Add* check box.

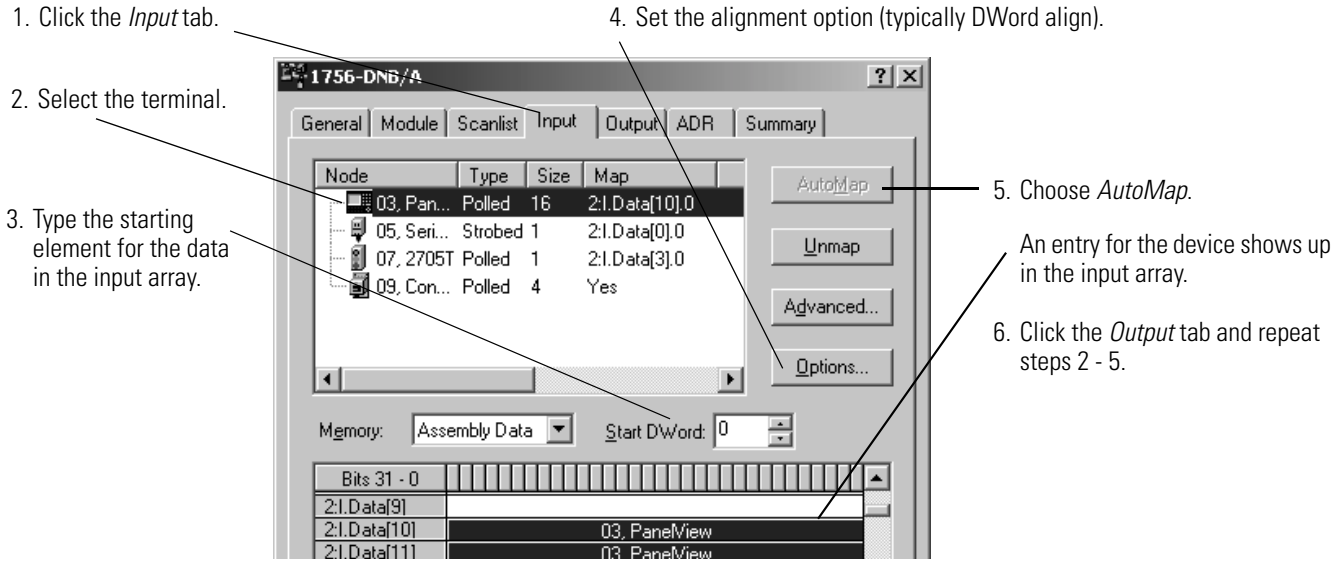


3. Add the terminal to the scan list.
4. Choose OK. In the next step, you define the I/O parameters for the PanelView terminal.

Edit I/O Parameters



Map Input and Output Data

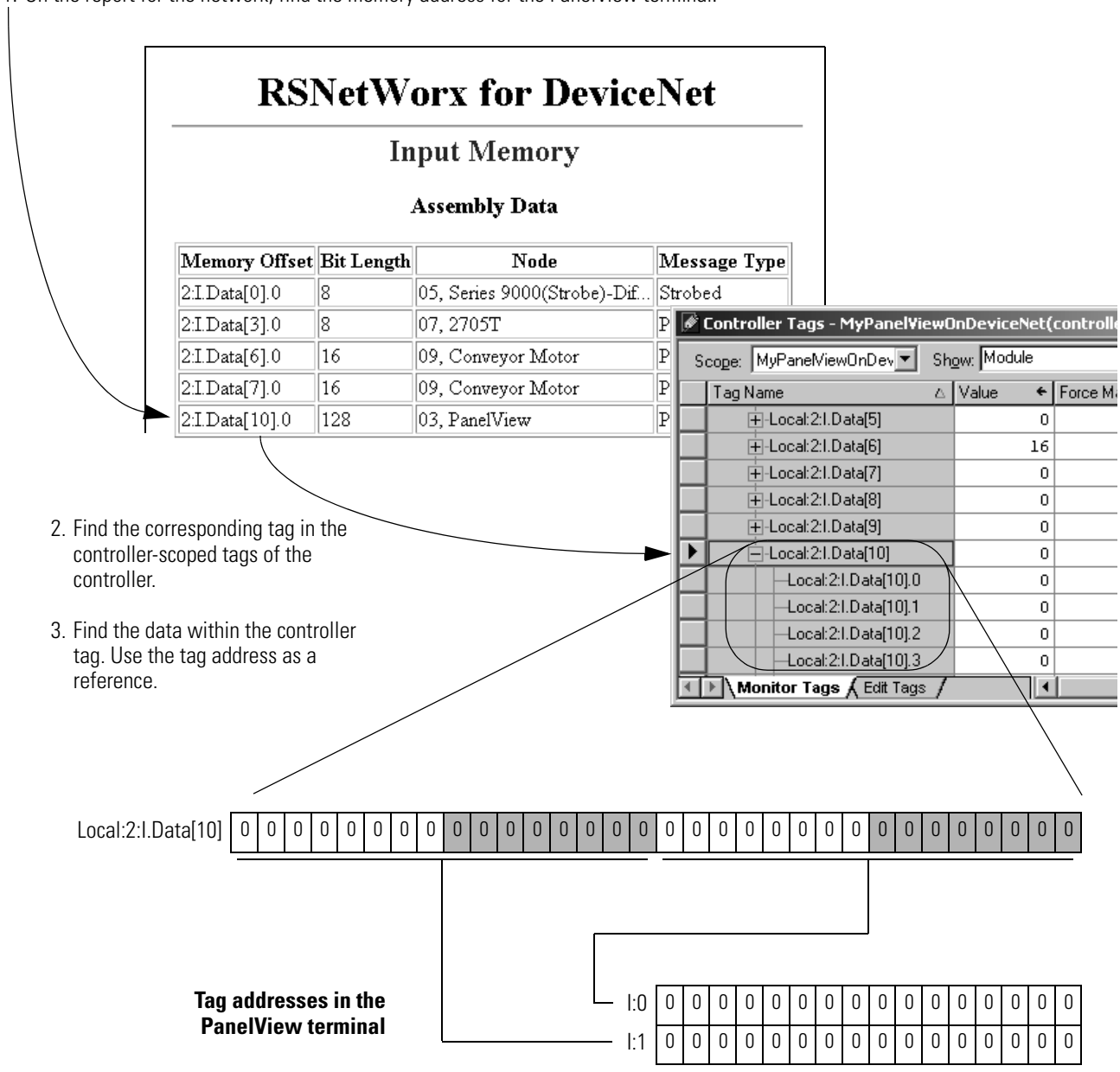


Address I/O Slave Tags in the RSLogix 5000 Project

To find the data for an I/O slave tag in your RSLogix 5000 project, get the following information:

- report for the network
- address for the tag in the PanelView terminal

1. On the report for the network, find the memory address for the PanelView terminal.



DeviceNet tags use this format:

The scanner memory uses this format:	Which is this tag in the controller:
slot:type.Data[*element*].*bit*	*location:type*.Data[*element*].*bit*

Where:	Is:		
location	location of the scanner in the system		
	If you have this scanner:	**Then location is:**	
	ControlLogix 1756-DNB	**In a:**	**Location is:**
		local chassis	Local:*slot_number_of_scanner*
		remote chassis	*adapter*:*slot_number_of_scanner* where: *adapter* is the name of the EthernNet/IP or ControlNet module in the remote chassis.
	CompactLogix 1769-SDN	Local:*slot_number_of_scanner*	
	SoftLogix5800 1784-PCIDS		
	FlexLogix 1788-DNBO	name of the scanner in the I/O configuration of the controller	
	EtherNet/IP to DeviceNet Linking Device (1788-EN2DN)		
	ControlNet to DeviceNet Linking Device (1788-CN2DN)		
type	type of data:		
	Where:	**Is:**	
	input from a device	I	
	output to a device	O	
	status of the network	S	
element	specific DINT (DWord, 32-bit integer) within the array		
bit	specific bit within an integer		

If You Have a SoftLogix5800 Controller

The SoftLogix5800 scanner 1784-PCIDS organizes input and output memory in 16-bit words. It uses the following address format:

word.bit

Where:	Is:
word	INT (16-bit integer) with the memory of the scanner
bit	specific bit within an integer

Plan and Configure Explicit Server Tags

Explicit server tags are similar to I/O tags except that the controller initiates the communication with the terminal. Explicit server tags *do not* show up on the input and output maps of the scanner.

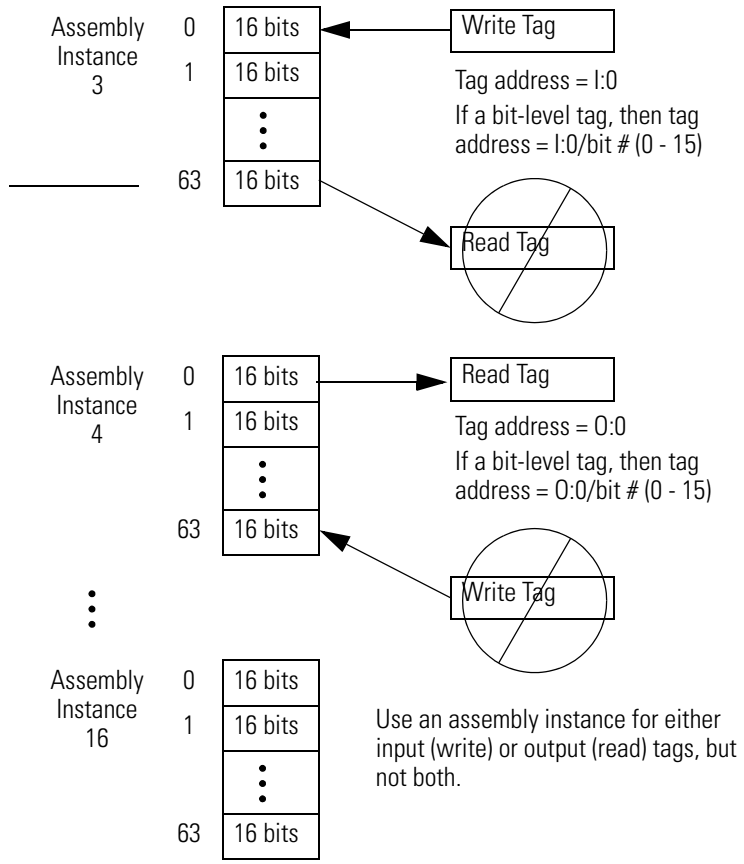
To configure an explicit server tag:

Step:	See page:
❑ Assign Assembly Instances	9-13
❑ For Integers, Skip Every Other Word	9-14
❑ Configure an Explicit Server Tag	9-15

Assign Assembly Instances

A PanelView terminal gives you 14 assembly instances (3 to 16) for explicit server tags.

Each instance give you 64 words for either input or output data.



Use an assembly instance for either input (write) or output (read) tags, but not both.

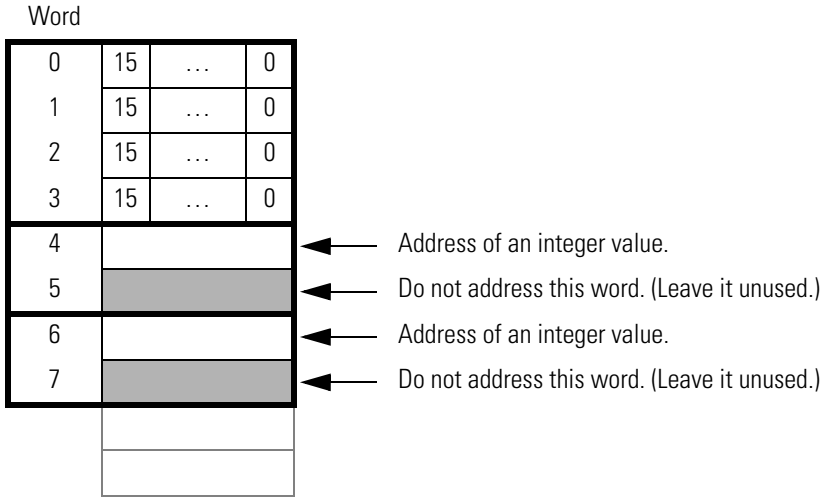
Determine how you will use each assembly instance:

Instance number:	Input (write) or output (read):	Instance number:	Input (write) or output (read):
1	input	9	
2	output	10	
3		11	
4		12	
5		13	
6		14	
7		15	
8		16	

For Integers, Skip Every Other Word

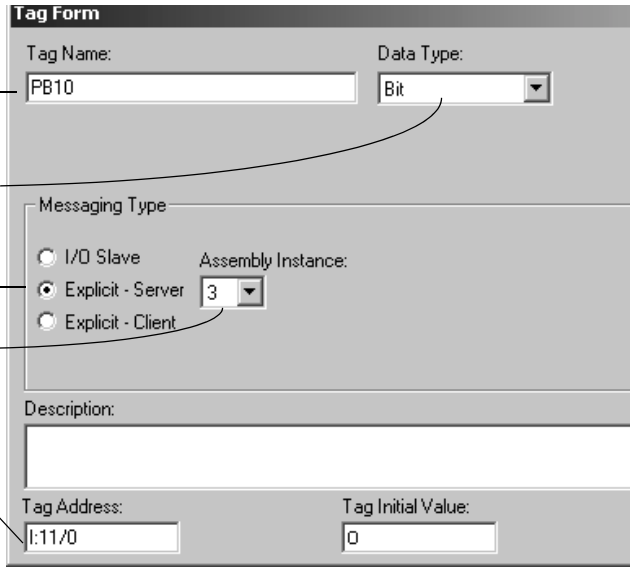
Logix5000 controllers use 32-bit integers (DINTs). To make your programming easier, lay out your PanelView tags as follows:

1. For bit-level tags, set aside an even number of words.
2. For each integer, set aside 2 words. Start each integer on an even word. This lets each integer map to its own element in the scanner/controller.



Configure an Explicit Server Tag

1. Type a descriptive name for the tag.
2. Select the data type for the tag.
3. Let the controller initiate the update.
4. Select the assembly instance for the tag.
5. Assign an address for the tag within the assembly instance.
   Write tag = `I:word/bit`
   Read tag = `O:word/bit`



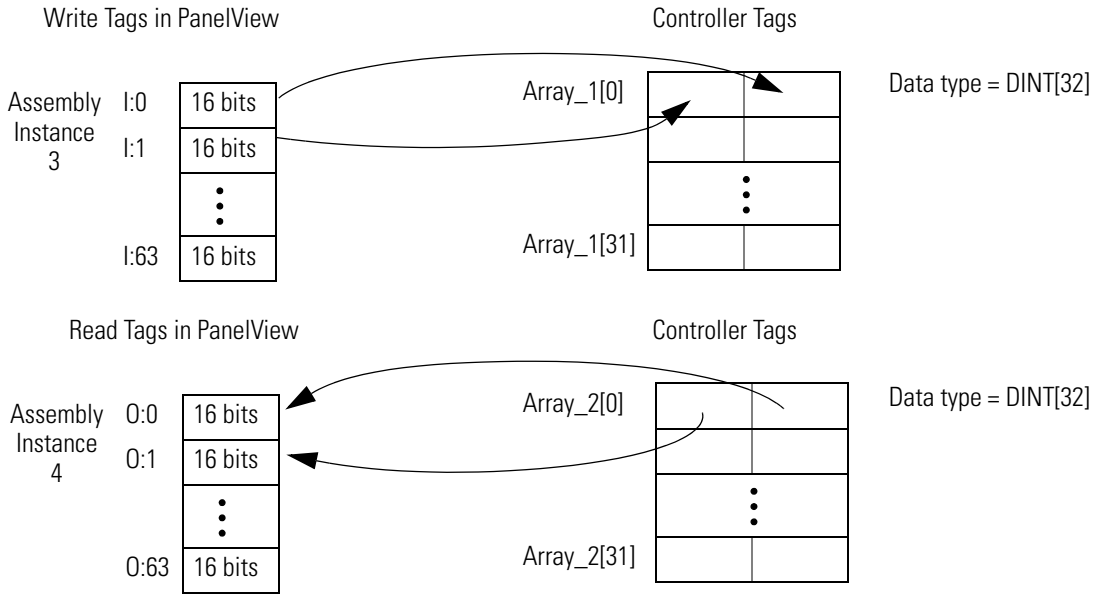
Program the Controller to Get/Set Explicit Server Tags

To let the controller read/write data from/to an explicit server tag:

Step:	See page:
❑ Create an Array for the Assembly Instance	9-16
❑ Enter and Configure the MSG Instruction	9-17
❑ Set the Communication Path	9-18

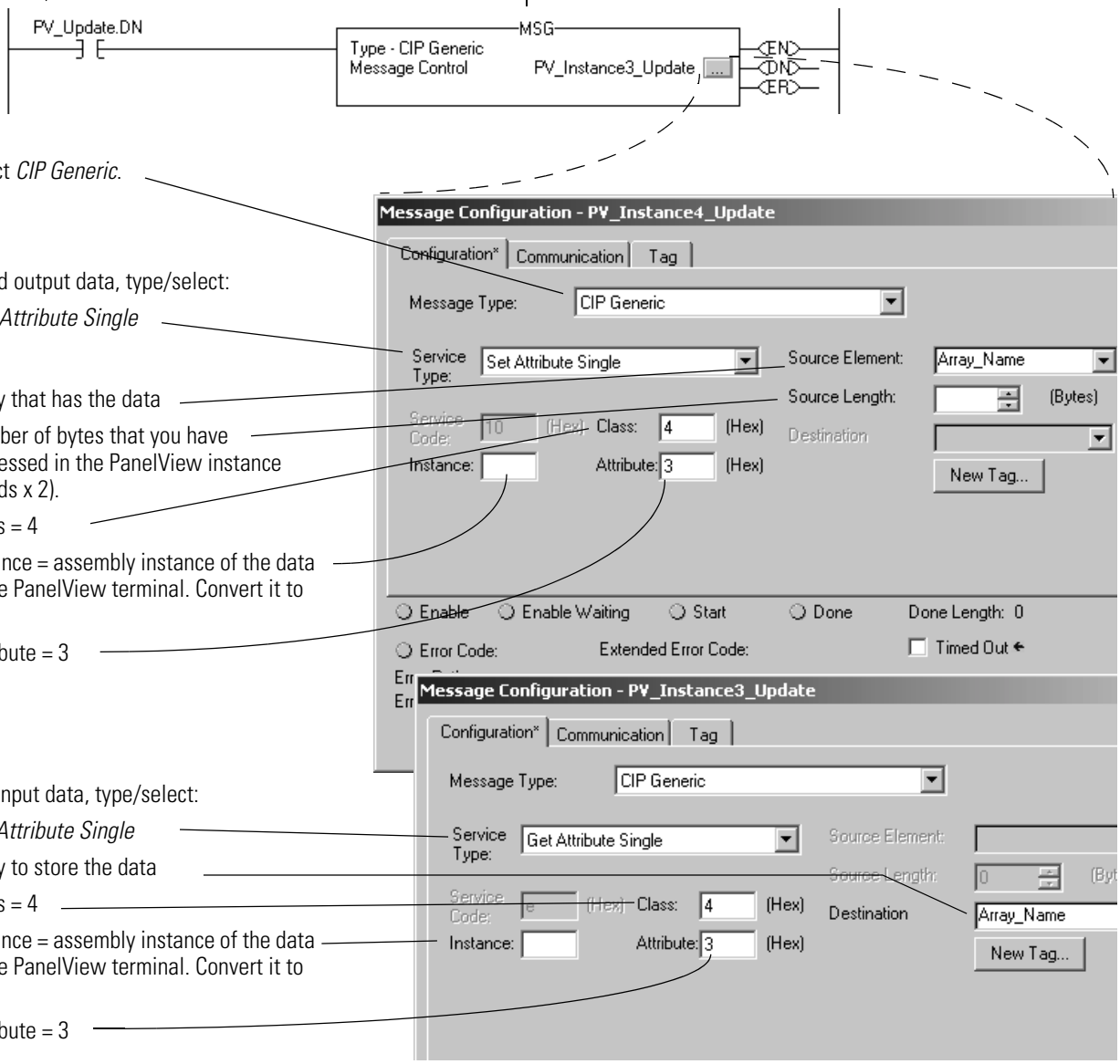
Create an Array for the Assembly Instance

For each assembly instance that you use for explicit server tags, create an array in the RSLogix 5000 project for the data.



Enter and Configure the MSG Instruction

1. Enter a condition for the data transfer, such as the DN bit of a timer.
2. Enter a MSG instruction.
3. Select *CIP Generic*.
4. To send output data, type/select:
   - *a. Set Attribute Single*
   - b. Array that has the data
   - c. Number of bytes that you have addressed in the PanelView instance (words x 2).
   - d. Class = 4
   - e. Instance = assembly instance of the data in the PanelView terminal. Convert it to hex.
   - f. Attribute = 3
5. To get input data, type/select:
   - *a. Get Attribute Single*
   - b. Array to store the data
   - c. Class = 4
   - d. Instance = assembly instance of the data in the PanelView terminal. Convert it to hex.
   - e. Attribute = 3



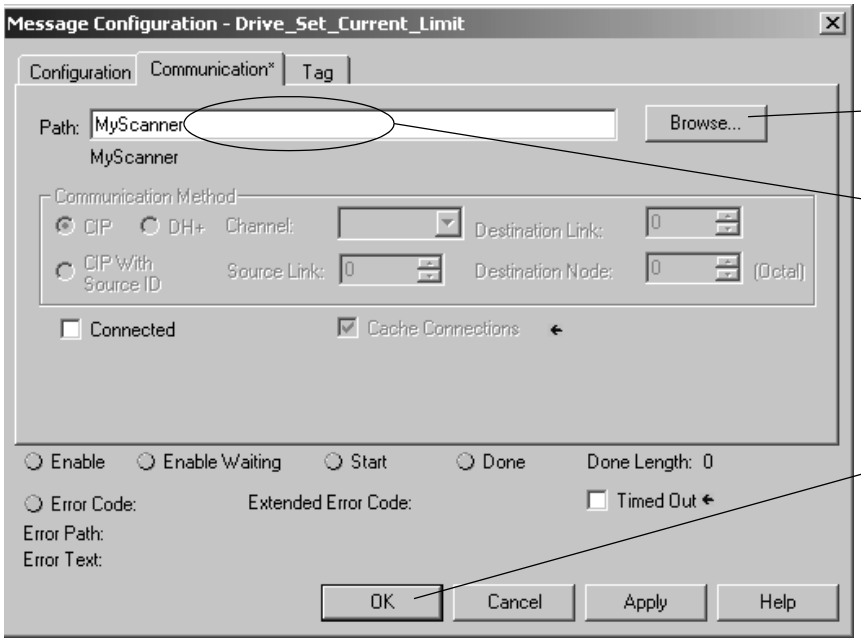
Set the Communication Path

The communication path specifies the route to the PanelView terminal. A communication path follows this format:

scanner_name,2,*device_address*

Where:	Is:
scanner_name	Name of the scanner in the I/O Configuration folder of the controller.
device_address	Address of the device on the DeviceNet network.

To set the path:

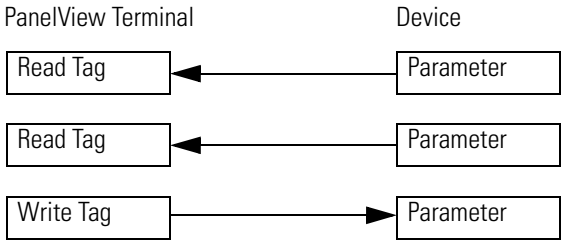


1. Click the *Communication* tab.
2. Click the Browse button and select the scanner.
3. Type the rest of the path.
4. Close the dialog box.

For more information on programming MSG instructions, see the *Logix5000 Controller General Instructions Reference Manual*, publication 1756-RM003.

Configure Explicit Client Tags

Use an explicit client tag to let the PanelView terminal get or set a parameter of another device on the DeviceNet network.



An explicit client tag:

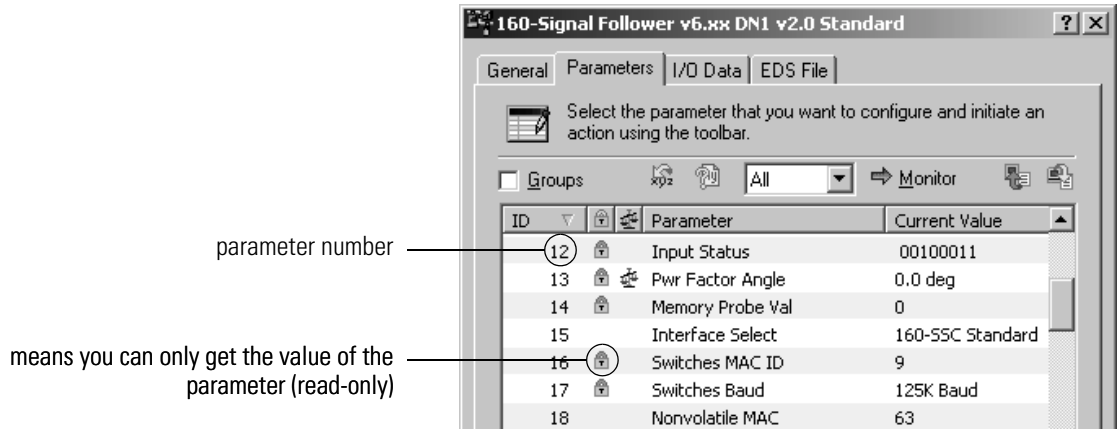
- *does not* show up on the input or output map of the scanner
- *does not* involve the controller
- *does not* use an address in an assembly instance of the PanelView terminal

To configure an explicit client tag:

Step:	See page:
❑ Determine the Parameter Number to Access	9-19
❑ Determine the Configuration of the Parameter	9-20
❑ Configure an Explicit Client Tag	9-21

Determine the Parameter Number to Access

Use RSNetWorx software to determine the parameter number that you want to access:

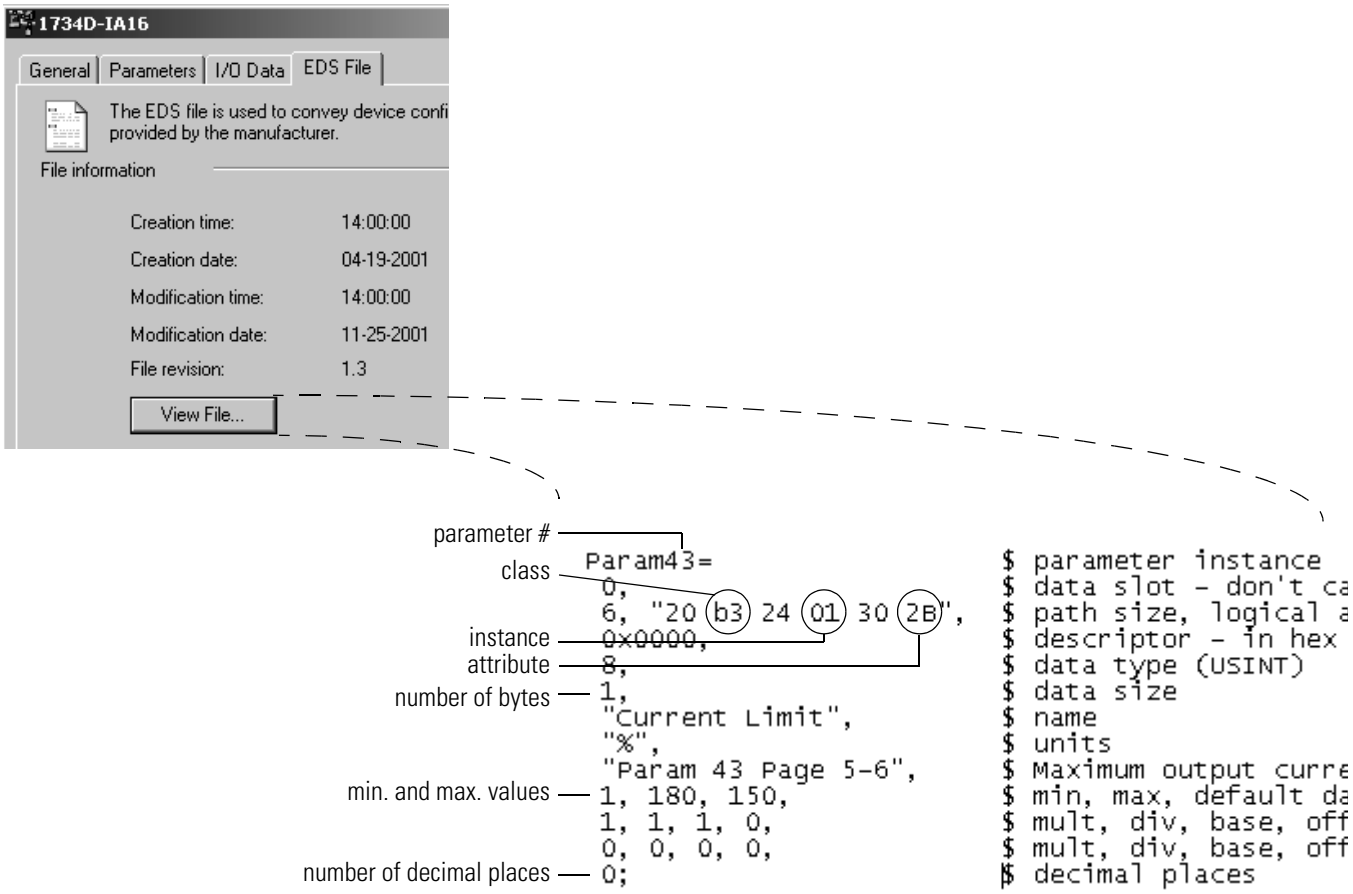


Determine the Configuration of the Parameter

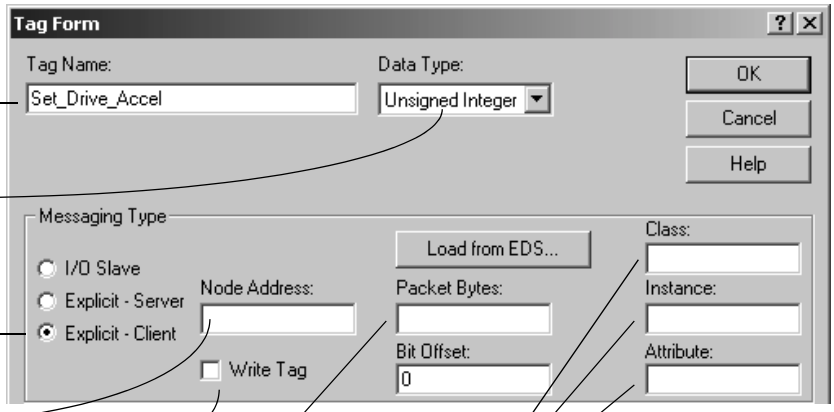
To get or set a parameter, find the following information about the parameter:

Item:	Value:
class # (hex)	
instance # (hex)	
attribute # (hex)	
number of bytes (size)	
minimum value	
maximum value	
decimal places (Some devices assume a specific number of decimal places in a value.)	

In addition to the documentation for the device, the EDS file may also give you the required information:



Configure an Explicit Client Tag



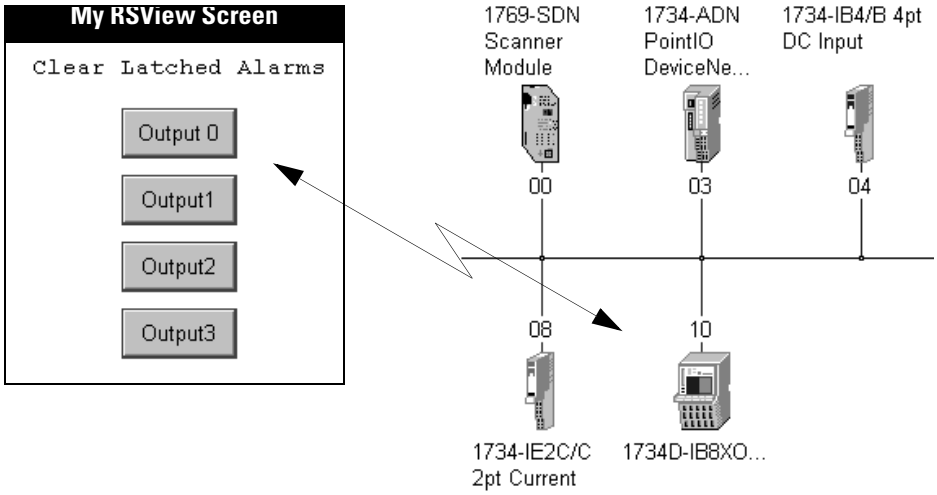
1. Type a descriptive name for the tag.
2. Select the data type for the tag.
3. Let the PanelView terminal initiate the update.
4. Type the address of the device.
5. If the PanelView terminal sets the parameter, check this box.
6. Type the number of bytes in the parameter.
7. Type the class, instance, and attribute numbers for the parameter.

Notes:

Communicate with an RSView® Project

Using This Chapter

This chapter describes how use an RSView project to get or set a parameter of a DeviceNet device.



IMPORTANT Once you add a device to the scan list of a scanner, HMI software such as RSView *cannot* write to (set) *some* parameters.

```
$ Output state
Param25 = $ Value for Output #0
    0,                                  $ reserved
    6,                                  $ Link Path Size
    "20 09 24 01 30 03",                $ Link Path to DOP object's value attribute.
    0x0022,                             $ No support for: settable path, scaling, scaling
                                        $ Real time update of value.  Value is gettable ar
    4,                                  $ Data Type - boolean
    1,                                  $ Data Size
    "Output Value #0",                  $ Parameter Name
    "",                                 $ Units String
    "Value of output point.'ON' or 'OFF'\nNOT SETTABLE when I/O conection is established."
    0,1,0,                              $ Min, Max (max enumeration #), and Default values
    1,1,1,0,0,0,0,0,0;                  $ Not Used
```

Once this device is in the scan list of the scanner, an RSView project cannot set this parameter.

To access the DeviceNet network, either connect the computer with the RSView application to any of the following networks:

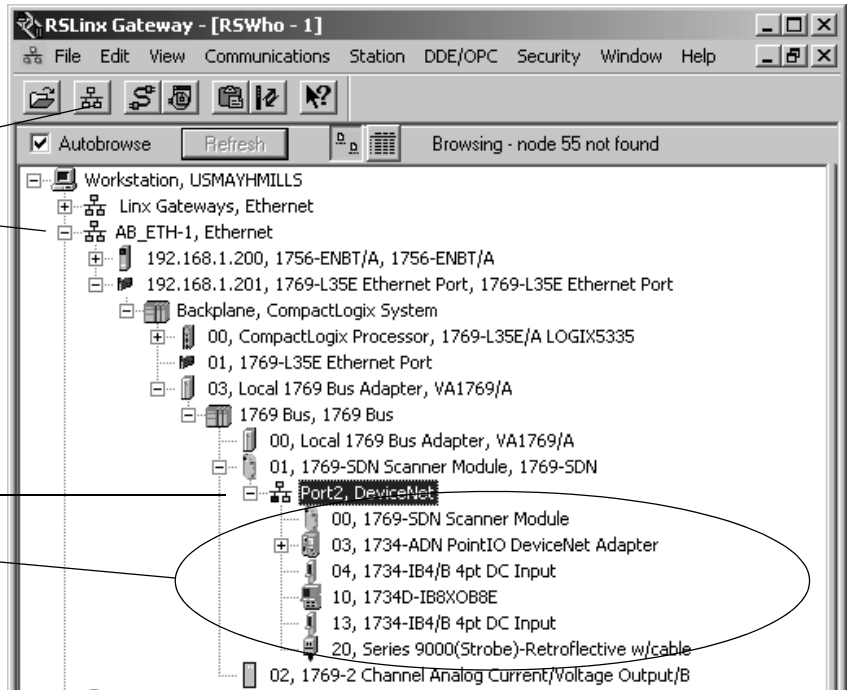
- same DeviceNet network as the desired device
- EtherNet/IP or ControlNet network and bridge communication to the DeviceNet network
  - Avoid bridging through a CompactLogix, FlexLogix, or DriveLogix controller. They have limited resources for bridging.
  - For those controllers, use the I/O tags in the controller, if possible.

To use an RSView project to get or set a parameter of a DeviceNet device:

Before You Use This Chapter

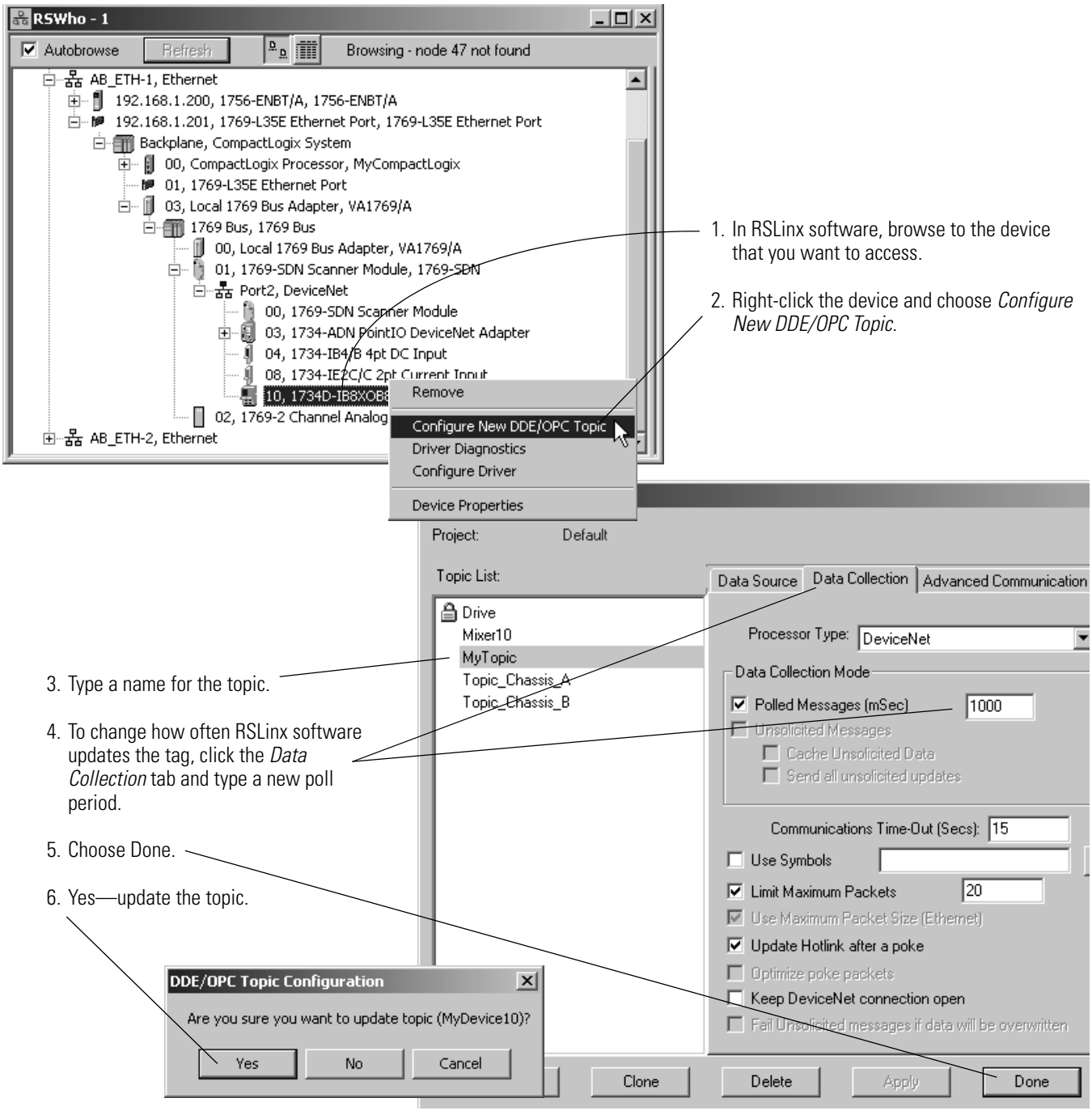
Before you use this chapter, make sure that you can see all your devices on the DeviceNet network.

1. Start RSLinx software.
2. Click the RSWho button.
3. Expand a driver that lets you access the DeviceNet network.
4. Browse to the DeviceNet network.
5. Make sure you see all the devices that are connected to the DeviceNet network.



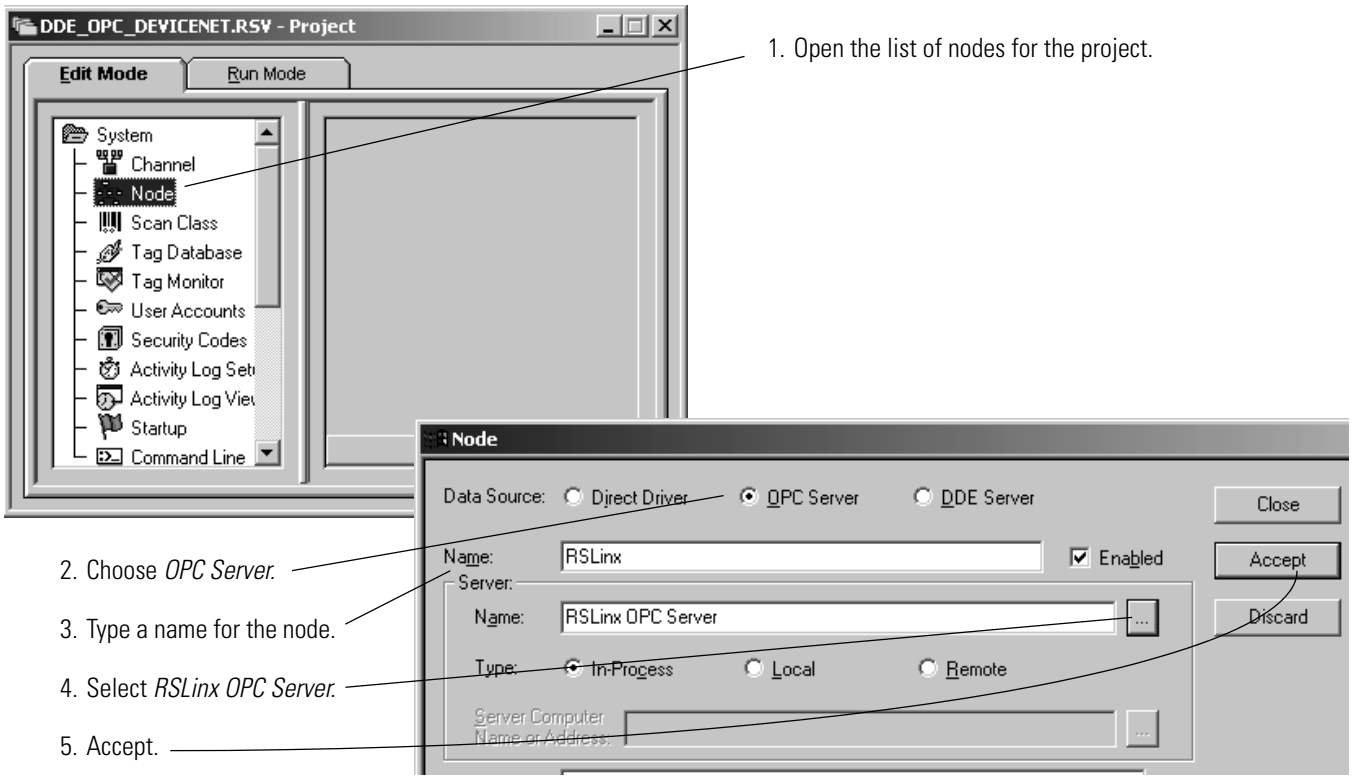
Create a Topic for the Device

Use RSLinx software to create a topic for the DeviceNet device that you want to access.



Create a Node

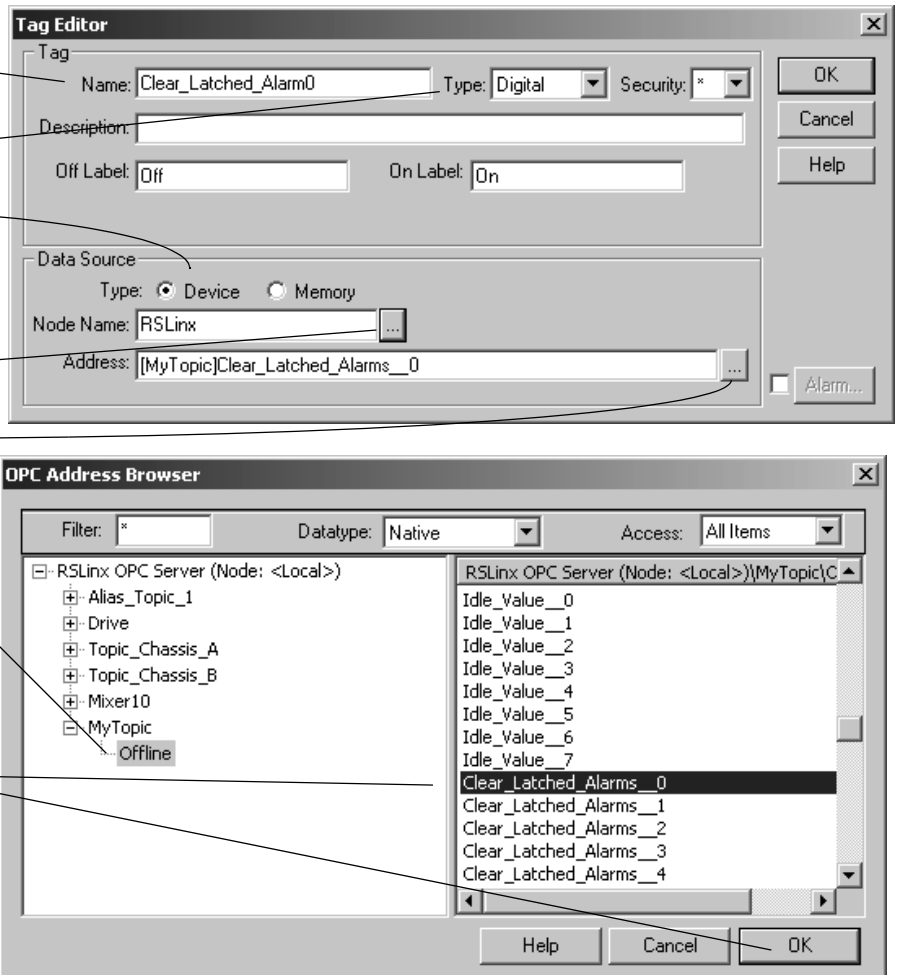
In the RSView project, create a node for your RSLinx topics:



Create a Tag for the Parameter

In the RSView project, create a tag for the parameter:

1. Type the name for the tag.
2. Select the type of data.
3. Select *Device*.
4. Select the node that contains the topic for the device.
5. Open the address browser.
6. Browse to offline list of tags for the topic (device).
7. Select the parameter and choose *OK*.



Notes:

Tune the Performance of a DeviceNet Network

Using This Chapter

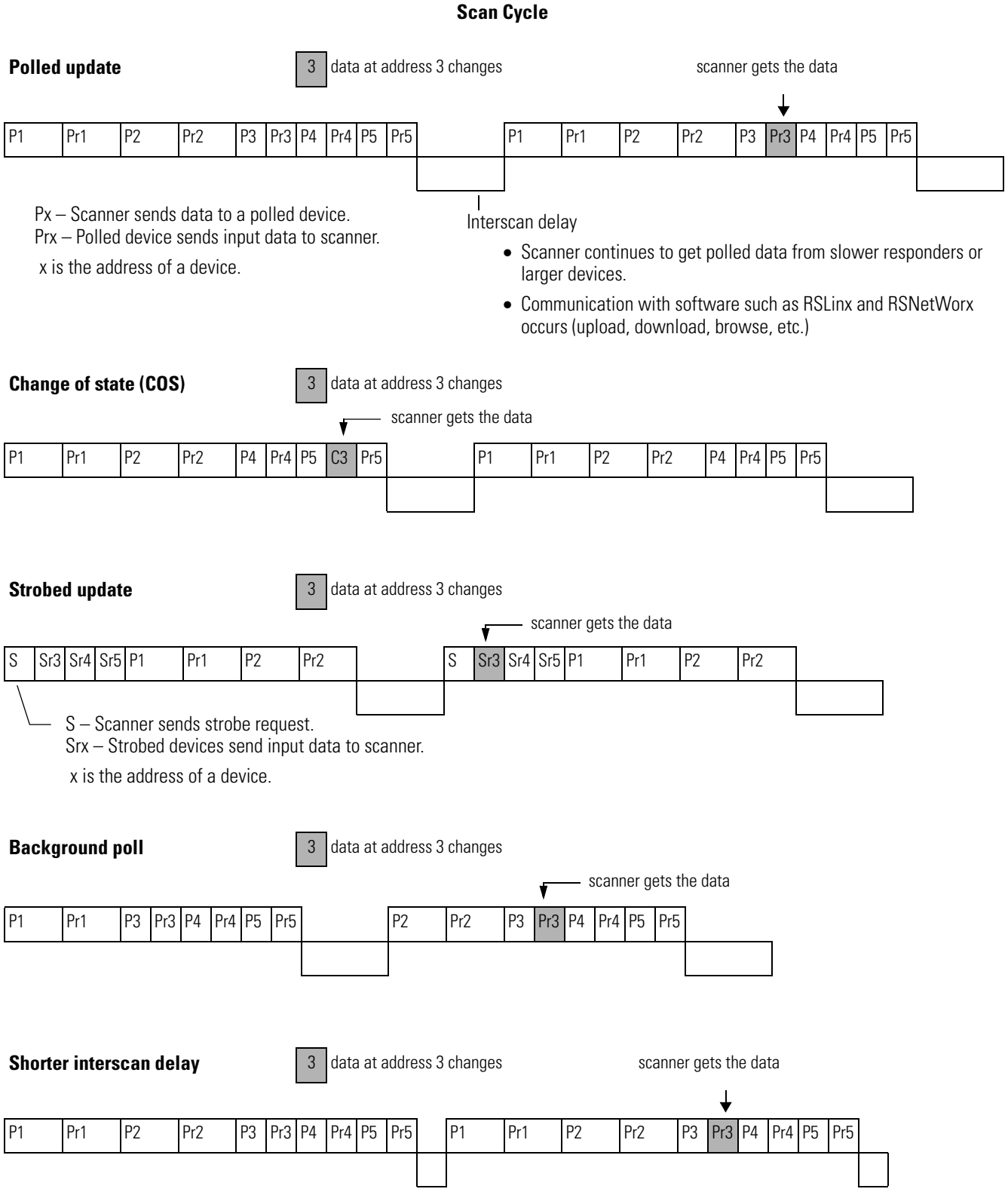
This chapter shows how to improve the performance of your network. As you configure and program your network, use the default settings whenever possible. Once your network is running, determine if you need to improve performance.

To improve the performance of your network, consider the following:

If:	Then:
a specific device requires a faster update	Change the I/O parameters of the device to *change of state* (COS).
an analog device *either*: • changes slower than the scan cycle • requires a repeatable update period (e.g., for PID calculations)	Change the I/O parameters of the device to *cyclic*.
multiple devices are: • input only *– and –* • I/O parameters are currently set to *polled* with an input size ≤ 8 bytes	For each of those devices, change their I/O parameters to *strobed*.
2 or more devices send or receive large amounts of data (e.g., PanelView operator terminal)	1. For each of those devices, set their I/O parameters to *polled* with a poll rate = *background*. 2. For the scanner, set the poll ratio = 2. Increase the poll ratio if needed.
communication intermittently stops (status code 78) with a device that: • sends or receives large amounts of data (e.g., PanelView operator terminal) *– and –* • has the I/O parameters currently set to *polled*	Increase the interscan delay.

Factors that Effect Performance

The following example shows how different I/O or network parameters effect the performance of the network.



I/O Parameters of Each Device

The type of connection (message) that you configure for a device determines when data transfers between the device and the scanner.

- Each device has a default connection type. This is a good starting point.
- Some devices may not offer all connection (message) types.

The following table describes the different types of connections (messages) that you can configure for a device.

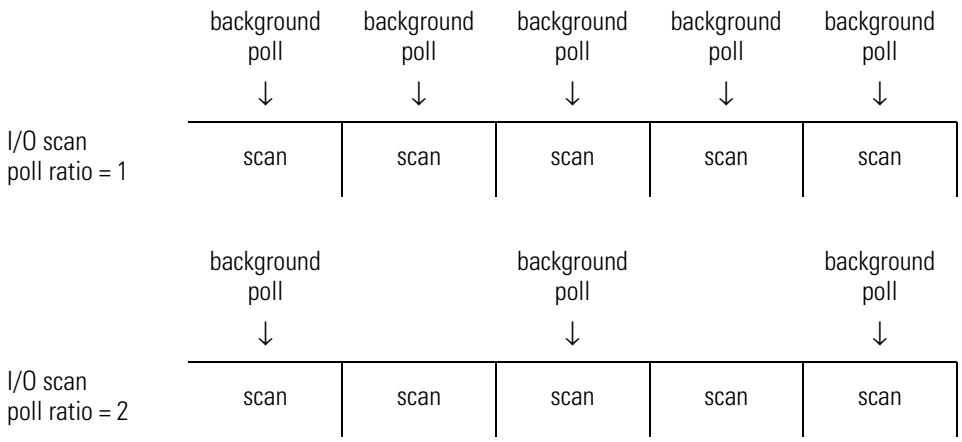
Connection (message) type:	Description:
cyclic	Data transfers at the period that you specify. The default range is 48 - 32,000 milliseconds.
change of state (COS)	Both the scanner and the device sends data whenever the data changes. You also specify a heartbeat period for the connection. • If the data does not change within the heartbeat period, the scanner and/or device sends their data at the end of the period. • This lets both the scanner and device know that the other is still operational.
strobed	The scanner sends a single strobed request to solicit data from the strobed devices. • The request is 64-bits long (1 bit for each node). • In response to the request, each device that is configured for a strobed connection sends its data (up to 8 bytes).
polled	A point-to-point data transfer that occurs every I/O scan or as a ratio of the I/O scan (background). • At the specified poll rate (every scan or background), the scanner sends data to a polled device (up to 255 bytes). The data is either output data for the device or a request for input data from the device. • If the polled device gets a request for input data, it sends its input data (up to 255 bytes).

Background Poll

The foreground to background poll ratio lets you adjust how often the scanner polls certain devices for their data. In general, use the default values. Change them only if you need to tune the performance of your system.

Parameter:	Description:	Default setting:
poll rate	• Applies to a device with a polled connection • Defines whether the scanner polls the device every I/O scan (foreground) or as a ratio of the I/O scan (background)	every scan
foreground to background poll ratio	• Applies to devices with a polled connection that is configured for a background poll rate. • Determines how often the devices are polled. • By default, the scanner performs background polls every scan (poll ratio = 1).	1

The following diagram show the effect of a change to the poll ratio:



IMPORTANT Keep the (foreground to background poll ratio) x (interscan delay) ≤ 75 ms (default expected packet value). Otherwise time-outs may occur.

For example, if you leave the interscan delay at 10 ms, then keep the poll ratio ≤ 7.

Interscan Delay

The interscan delay determines how long the scanner waits before it starts another I/O scan. In general, leave it at its default value. Change it only if you need to tune the performance of your system.

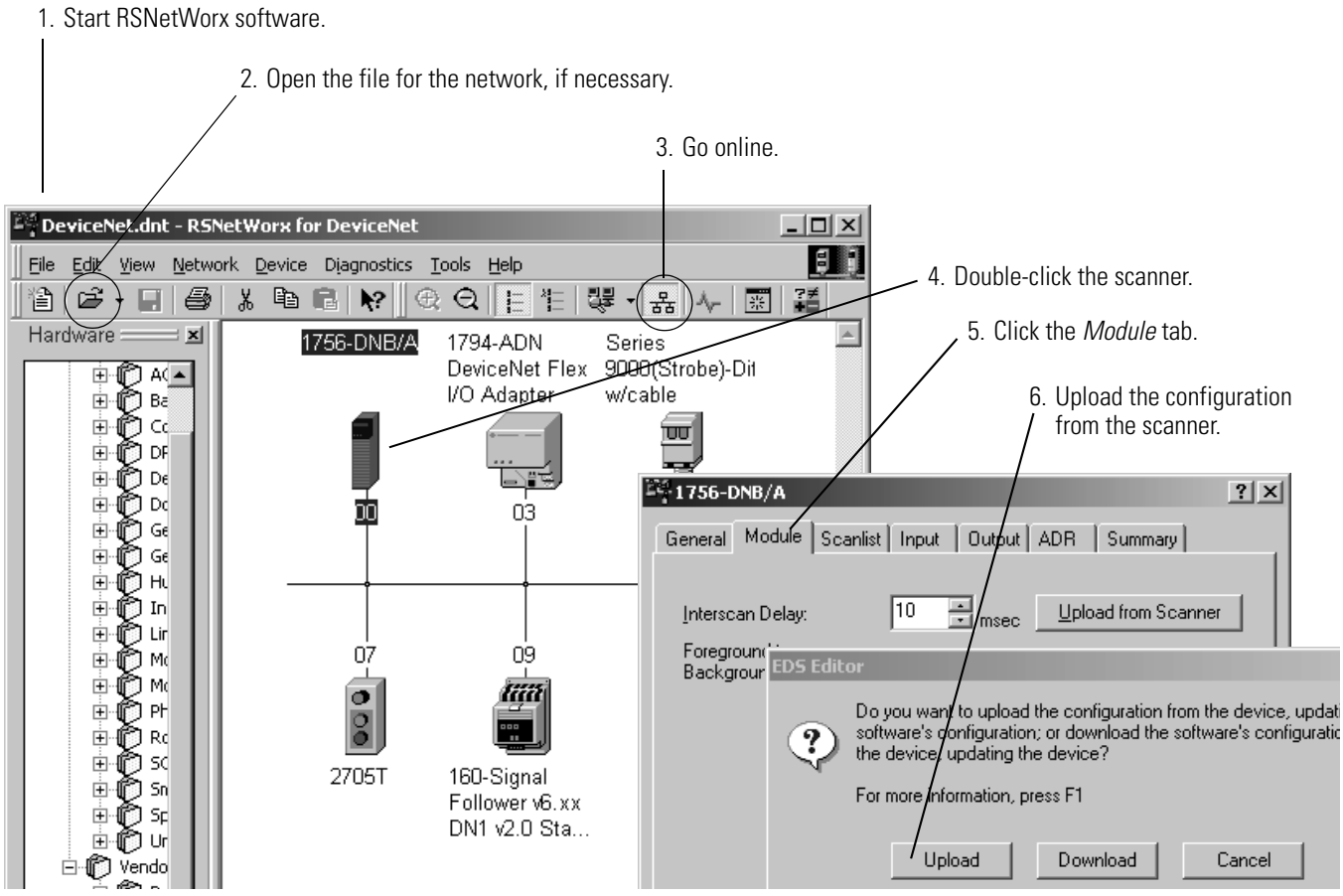
Parameter:	Description:	Default setting:
interscan delay	• Last segment of the I/O scan • Follows the last polled request • Provides time for larger devices and slower responders to return their polled data • Provides time for software such as RSLinx and RSNetWorx to access the network for upload, download, browse, etc. • Scanner waits the interscan delay before it strobes or polls devices again. • A shorter interscan delay may improve the update time of strobed or polled data. • Keep the interscan delay ≥ 5 ms. Otherwise you may have trouble accessing the network. • Keep the (foreground to background poll ratio) x (interscan delay) ≤ 75 ms (default expected packet value). Otherwise time-outs may occur.	10 ms

Change the Configuration of the Network

To change the configuration of the network, use RSNetWorx software to perform the following:

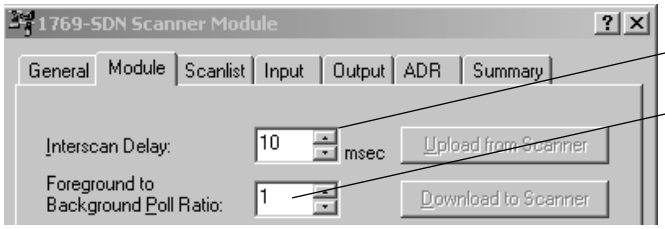
Step:	See page:
❑ Upload the Current Configuration of the Scanner	11-5
❑ Set the Interscan Delay and Poll Ratio	11-6
❑ Set the I/O Parameters of a Device	11-6
❑ Download the Configuration to the Scanner	11-8
❑ Save the Network File	11-9

Upload the Current Configuration of the Scanner



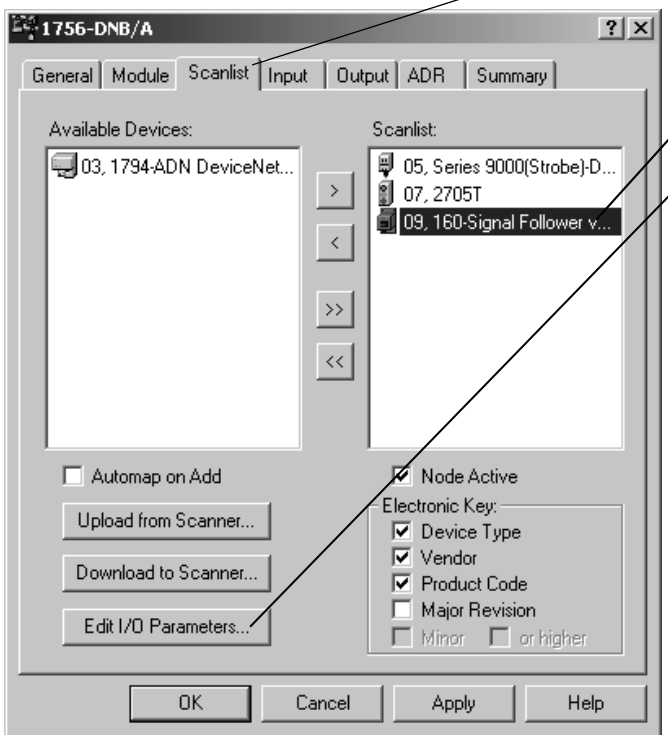
Set the Interscan Delay and Poll Ratio

Change these values only if needed.



1. Type or select the time for the interscan delay.
2. Type or select the poll ratio.

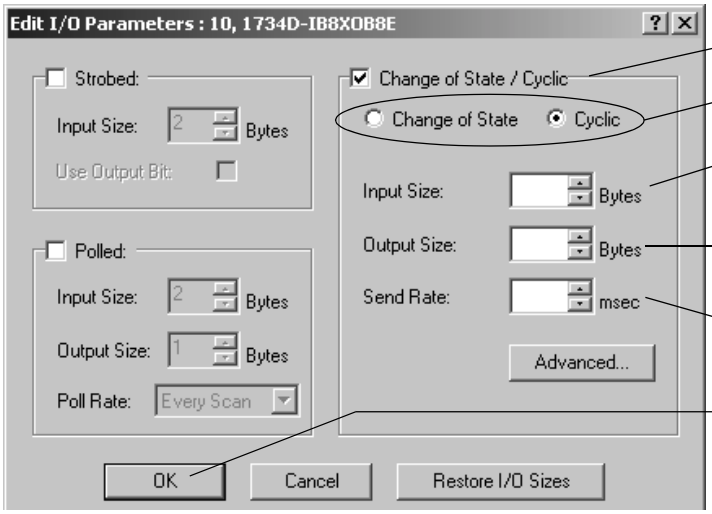
Set the I/O Parameters of a Device



1. Click the *Scanlist* tab
2. Select the device.
3. Choose *Edit I/O Parameters*.
4. Set the I/O parameters:

For:	See page:
Change of State or Cyclic Transfer	11-7
Strobed Transfer	11-7
Polled Transfer	11-8

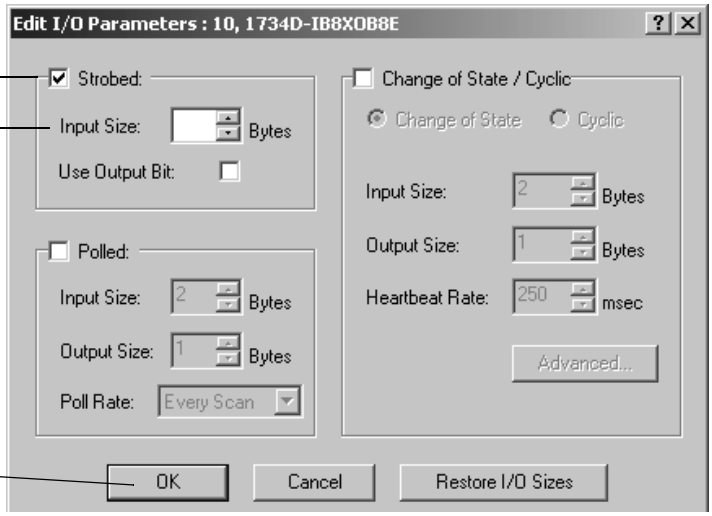
Change of State or Cyclic Transfer



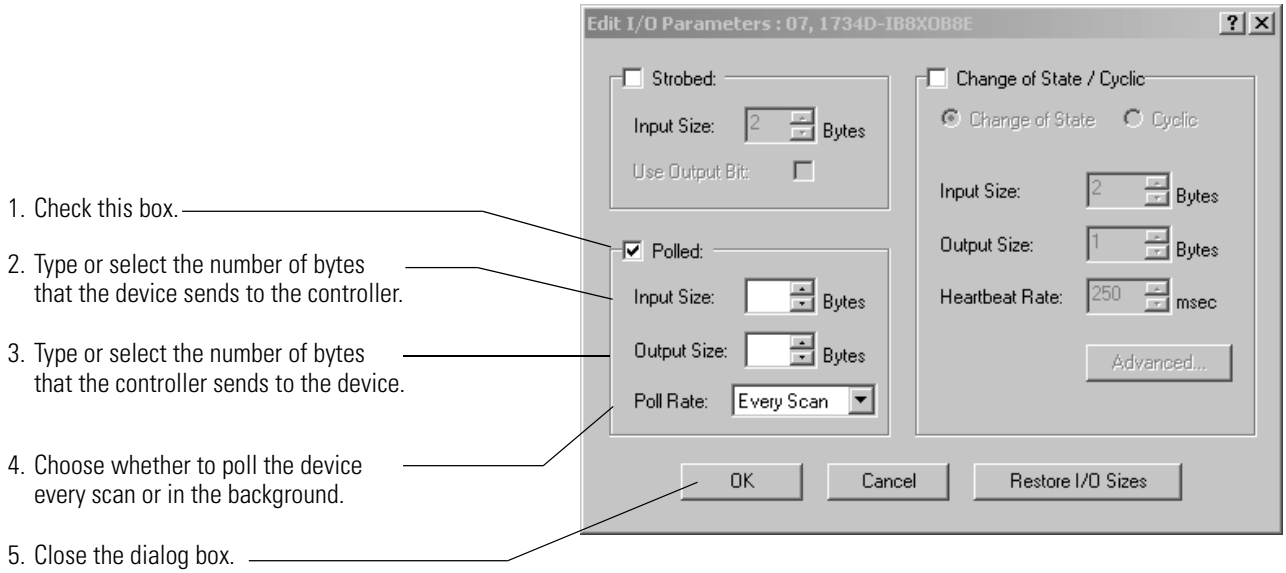
1. Check this box.
2. Choose *Change of State* or *Cyclic*.
3. Type or select the number of bytes that the device sends to the controller.
4. Type or select the number of bytes that the controller sends to the device.
5. For a cyclic update, type the period of the update.
6. Close the dialog box.

Strobed Transfer

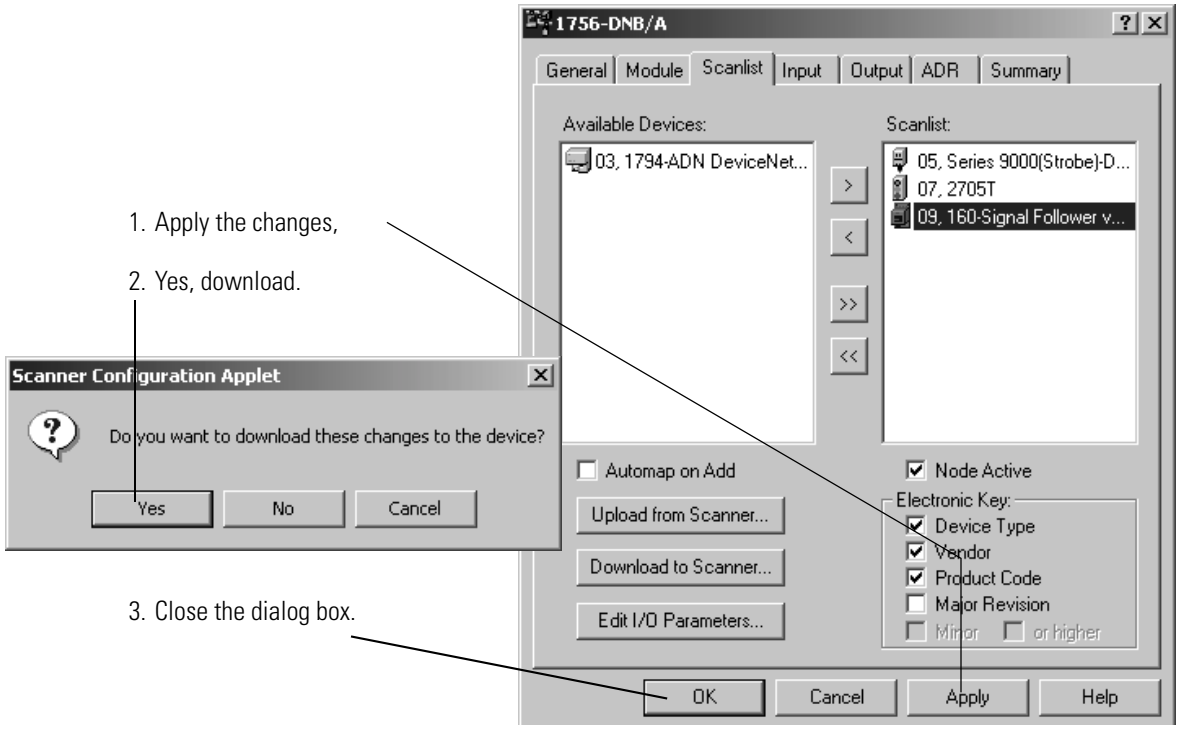
1. Check this box.
2. Type or select the number of bytes that the device sends to the controller.
3. Close the dialog box.



Polled Transfer



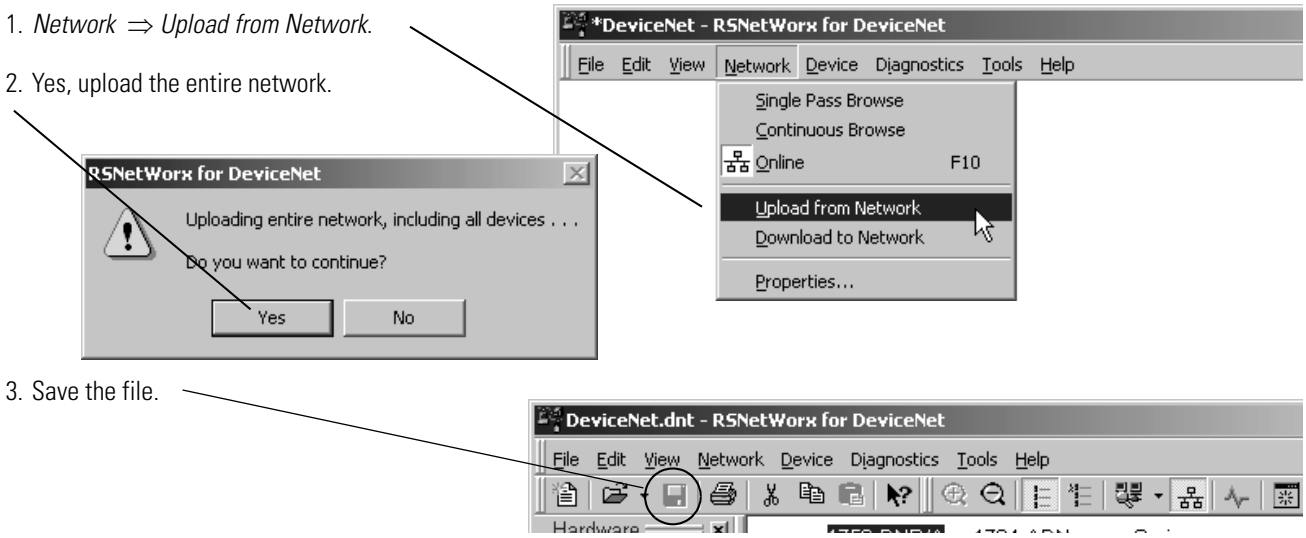
Download the Configuration to the Scanner



Save the Network File

After you make a change to your network, upload the entire network and save the file. This makes sure that the offline configuration file matches the network.

1. *Network* ⇒ *Upload from Network*.
2. Yes, upload the entire network.
3. Save the file.



Notes:

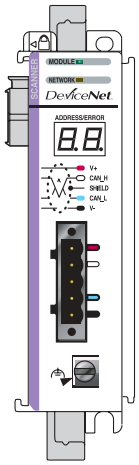
Troubleshoot a DeviceNet Network

Using This Chapter

A DeviceNet network gives you the following status information:

Front Display

To interpret the display or status indicators of a device:



CompactLogix Scanner 1769-SDN

2 Character numeric display:

- Shows the status code and address of the device (status code first, then address).
- If a device has a problem, it shows the status code and address of the device (status code first, then address).

To interpret the status codes, see Status Codes on page 12-16.

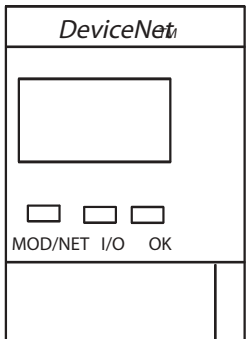
Module status indicator:

State:	Description:	Recommended Action
off	No power applied to module.	Apply power.
flashing green	No MicroLogix or CompactLogix controller is present.	1. Make sure module connectors are properly seated. 2. Cycle power to the controller. 3. Replace the controller. 4. Replace the device.
solid green	Device is OK.	None.
flashing red	Recoverable Fault - Memory has been erased or is being programmed.	Complete flash update or start a new update.
solid red	Unrecoverable fault	1. Make sure the device connectors are properly seated. 2. Make sure the bus terminator/end cap is installed. 3. Cycle power. 4. Replace the device.

Network status indicator:

State:	Description:	Recommended Action
off	Any of the following: • No device power. • No network power. • Communications are *not* occurring between the device and the DeviceNet network.	1. Make sure the device has power. 2. Make sure the DeviceNet cable is securely connected and the DeviceNet network has power. 3. Make sure the network power is adequate (11 to 25V dc).
flashing green	Device is OK but is *not* communicating with other devices on the network.	If the device is supposed to communicate with other devices, add those devices to the scan list of this device.
solid green	Device is OK, has a scan list and is *not* in Idle mode.	None.
flashing red	Communication with at least 1 device has timed out.	Check the 2-character display to determine which device has timed out.
solid red	Any of the following: • Another device is using the same address. • Communication problems on the network (bus off condition).	• Make sure the device has a unique address. • Make sure all devices are at the same baud rate. • Cycle power to the device. • For more corrective actions, see status code 91 on page 12-17

ControlLogix Scanner 1756-DNB



4-Character display:

Display:	Description:
A#*xx*	Address of this device, where: *xx* is the address.
IDLE	Device is in idle mode.
AUTO	The AutoScan option is on and the device is in idle mode.
RUN	Device is in run mode.
No Network Power	The DeviceNet cable is *not* supplying power to the communication port.
Network Disabled	Controller has set the device to the disabled mode.
No Rx	Either or both of the following: • The device does not have a scan list. • The device has *not* received communication from any other device
No Tx	Device has failed to transmit a message.
N#*xx*	Another device has a problem, where: *xx* is the address of the device. The status code for the device follows the address.
E#*xx*	Status code (page 12-16) for a device with a problem, where: *xx* is the status code for the device. The address of the device comes before the status code.

Module/Network (Mod/NET) status indicator

State	Description:	Recommended Action
off	• The device has not completed the Dup_MAC_ID test. • The device may *not* have power.	Make sure the device has power.
solid green	Device is OK and is communicating with other devices on the network.	None.
flashing green	Device is OK but is *not* communicating with other devices on the network.	If the device is supposed to communicate with other devices, add those devices to the scan list of this device.
flashing red	Either or both of the following: • Recoverable fault. • Communication with at least 1 device has timed out.	Check the 4-character display to determine if/which device has timed out.
solid red	Any of the following: • Another device is using the same address. • Communication problems on the network (bus off condition). • Device has an unrecoverable fault and may need to be replaced.	• Make sure the device has a unique address. • Make sure all devices are at the same baud rate. • Cycle power to the device. • For more corrective actions, see status code 91 on page 12-17
flashing red/green	Device is in self test.	None.

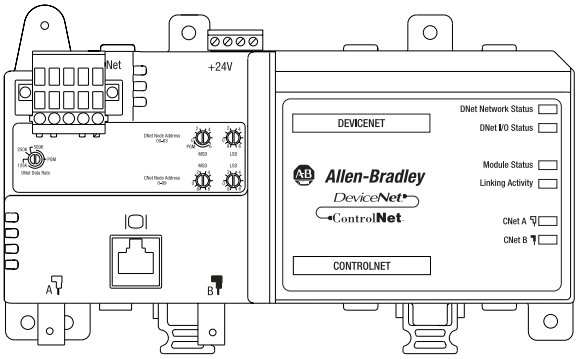
I/O status indicator

State:	Description:	Recommended Action
off	The DeviceNet cable is *not* supplying power to the communication port.	Apply network power.
flashing green	The device is in idle mode and is *not* communicating with the devices on the network.	To control output devices, place the scanner in run mode.
solid green	The device is in run mode and is communicating with the devices on the network.	None.

OK status indicator

State:	Description:	Recommended Action
off	The device does *not* have power.	• Turn on power to the chassis. • Make sure the device is fully inserted into the chassis.
flashing green	The device is OK but is *not* communicating with the controller.	Make sure that the device is correctly configured in the I/O configuration of the controller.
solid green	The device is OK and communicating with the controller.	None.
solid red	• The device is powering-up. • The device has an unrecoverable fault.	1. Wait to verify that the device has completed its power up sequence. 2. If the device appears to have completed its power up sequence, cycle power to the device. 3. Replace the device.

ControlNet to DeviceNet Linking Device 1788-CN2DN



DeviceNet Network Status indicator

State:	Description:	Recommended Action
off	• Device is *not* online. • *No* network power. • The device may *not* be powered.	1. If the module (MS) indicator is off, turn on power to the device. 2. Make sure the DeviceNet cable is supplying power to the communication port.
flashing green	Device is OK but is *not* communicating with other devices on the network.	If the device is supposed to communicate with other devices, add those devices to the scan list of this device.
solid green	Device is OK and is communicating with other devices on the network.	None.
flashing red	Communication with at least 1 device has timed out.	Check the status tags of this device to determine which device has timed out.
solid red	Any of the following: • Another device is using the same address. • Communication problems on the network (bus off condition). • Device has an unrecoverable fault and may need to be replaced.	• Make sure the device has a unique address. • Make sure all devices are at the same baud rate. • Cycle power to the device. • For more corrective actions, see status code 91 on page 12-17

DeviceNet I/O Status indicator

State	Description	Recommended Action
flashing green	Device is in idle mode	To control outputs, place the device in run mode.
solid green	Device is in run mode	None.
off	• Device is *not* online. • *No* network power. • The device may *not* be powered.	1. If the module (MS) indicator is off, turn on power to the device. 2. Make sure the DeviceNet cable is supplying power to the communication port.

Module Status indicator

State	Description	Recommended Action
off	No power.	Turn on power to the device.
flashing green	The device is *not* configured and is in a standby state.	Configure the device.
solid green	Normal operation	None.
solid red	Device has an unrecoverable fault.	1. Cycle power to the device. 2. Replace the device
flashing red	• Recoverable fault. • DNet Data Rate or DNet Node Address switches are set in the PGM range.	• Clear the fault. • Change switch settings.

Linking Activity status indicator

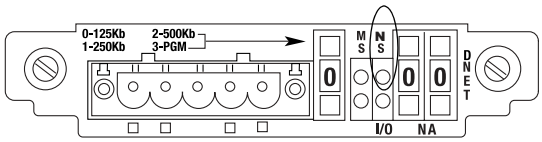
State	Description
off	No traffic
flashing green	Traffic present (flash rate reflects amount of traffic)
flashing red and green	Module is running boot code only (reduced functionality code only for FLASH upgrading)

ControlNet Network (CNet A, CNet B) status indicators

If more than one state is present, the indicators always reflect the highest priority status present on the network. Note that these indicators *do not* reflect the status of the network access port (NAP).

State	Priority	How to View	Cause
both steady off	1 (highest)	View together	Reset or no power
both steady red	2		Failed to link interface to ControlNet
alternating red & green	3		Self testing
alternating red	4		Bad node configuration (such as duplicate ControlNet network address)
steady off	5	View independently	Channel disabled or not supported
flashing red & green	6		Invalid link configuration
flashing red	7		Link fault or no frames received
flashing green	8		Temporary channel error or listen only
steady green	9 (lowest)		Normal operation

DriveLogix and FlexLogix Scanner 1788-DNBO



Module status (MS) indicator

State:	Description:	Recommended Action
off	No power applied to device.	Turn on power to the controller.
solid green	Device is OK.	None.
flashing green	Device either needs commissioning or is in the standby state.	Make sure the device is correctly configured.
flashing red	Recoverable fault.	Make sure the scan list of the device matches the configuration of the network.
solid red	Device has an unrecoverable fault.	1. Cycle power to the controller. 2. Replace the device
flashing red-green	Device is in self test.	None.

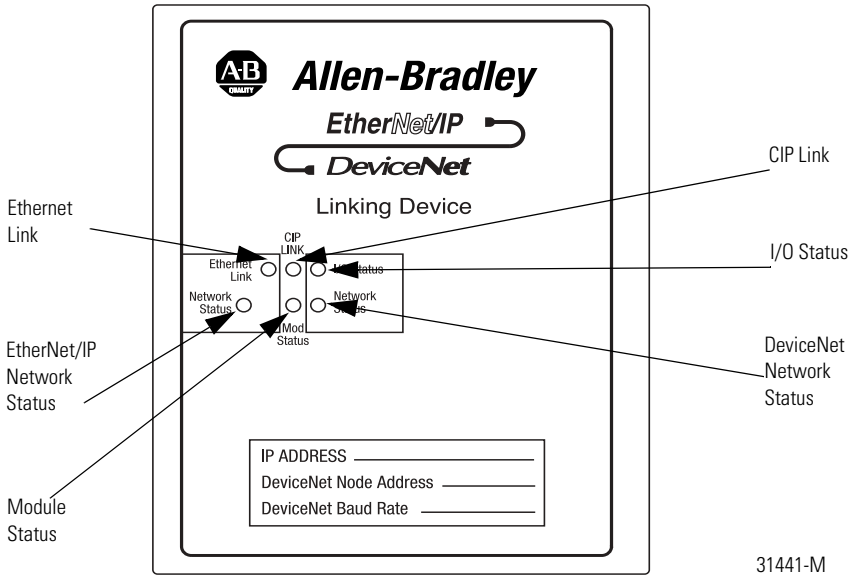
Network status (NS) indicator

State:	Description:	Recommended Action
off	• Device is not online. • The device has not completed the Dup_MAC_ID test. • The device may not be powered.	If the module (MS) indicator is off, turn on power to the controller.
flashing green	Device is OK but is *not* communicating with other devices on the network.	If the device is supposed to communicate with other devices, add those devices to the scan list of this device.
solid green	Device is OK and is communicating with other devices on the network.	None.
flashing red	Communication with at least 1 device has timed out.	Check the status tags of this device to determine which device has timed out.
solid red	Any of the following: • Another device is using the same address. • Communication problems on the network (bus off condition). • Device has an unrecoverable fault and may need to be replaced.	• Make sure the device has a unique address. • Make sure all devices are at the same baud rate. • Cycle power to the device. • For more corrective actions, see status code 91 on page 12-17

I/O status indicator

State:	Description:	Recommended Action
off	Device is *not* online.	Check network power.
solid green	Device is in run mode, outputs are under control, and inputs are being consumed.	None.
flashing green	Device is in idle mode, outputs are *not* under control, and inputs are being consumed.	To control outputs, place the device in run mode.

EtherNet/IP to DeviceNet Linking Device 1788-EN2DN



Ethernet Link status indicator

State	Description	Recommended Action
solid green	Device is connected to an EtherNet/IP network.	None.
flashing green	Device is sending or getting data.	None.

Ethernet (Network Status) status indicator

State	Description	Recommended Action
off	Device has no IP address.	Give the device an IP address.
solid green	Device has at least 1 connection on the EtherNet/IP network.	None.
flashing green	Device has *no* connections on the EtherNet/IP network.	To use the device as a scanner, add it to the I/O configuration of the controller.
solid red	The module's IP address is already in use by another module.	Change the IP address.
flashing red	Communication with at least 1 device on the EtherNet/IP network has timed out.	1. Re-establish communication with the device. 2. Reset the module.
red/green alternate flashing	A self-test of the module is in progress	None.

CIP Link status indicator

State	Description
solid green	EtherNet/IP I/O connection is active.
flashing green	Data is going between the networks.

Module (Mod Status) indicator

State	Description	Recommended Action
flashing green	• The device is *not* configured and is using default values. • The device is in a standby state. This could occur during initialization or DeviceNet autobaud.	1. Configure the device. 2. Turn off autobaud.
solid green	Normal operation	None.
solid red	Device has an unrecoverable fault.	1. Cycle power to the device. 2. Replace the device
flashing red	Recoverable fault.	Clear the fault.

I/O Status indicator

State	Description	Recommended Action
flashing green	Device is in idle mode	To control outputs, place the device in run mode.
solid green	Device is in run mode	None.
solid orange	Device is powering up.	None.
flashing red/green	A fault has been detected.	Clear the fault.
off	There are no devices in the scan list.	If the device is supposed to communicate with other devices, add those devices to the scan list of this device.

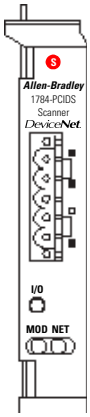
DeviceNet (Network Status) indicator

State	Description	Recommended Action
flashing green	Device is OK but is *not* communicating with other devices on the network.	If the device is supposed to communicate with other devices, add those devices to the scan list of this device.
solid green	Device is OK and is communicating with other devices on the network.	None.
flashing red	Communication with at least 1 device has timed out.	Check the status tags of this device to determine which device has timed out.
solid red	Any of the following: • Another device is using the same address. • Communication problems on the network (bus off condition). • Device has an unrecoverable fault and may need to be replaced.	• Make sure the device has a unique address. • Make sure all devices are at the same baud rate. • Cycle power to the device. • For more corrective actions, see status code 91 on page 12-17

SoftLogix5800 Scanner 1784-PCIDS

The physical device has the following status lights:

I/O status indicator



State:	Description:
off	All inputs and outputs are inactive.
green	• One or more outputs are active and under control, and no outputs are faulted. • One or more inputs are active and producing data, and no inputs are faulted.
flashing green	One or more outputs are idle and no outputs are active or faulted.
flashing red	• One or more outputs are faulted, and may be in the fault state. • One or more inputs are faulted, and may be in the fault state.
solid red	• One or more outputs are forced off (may be an unrecoverable fault). • One or more inputs has an unrecoverable fault.

Module (MOD) status indicator

State:	Description:	Recommended Action
off	No power applied to device.	Turn on power to the controller.
solid green	Device is OK.	None.
flashing green	Device either needs commissioning or is in the standby state.	Make sure the device is correctly configured.
flashing red	Recoverable fault.	Make sure the scan list of the device matches the configuration of the network.
solid red	Device has an unrecoverable fault.	1. Cycle power to the computer. 2. Replace the device
flashing red-green	Device is in self test.	None.

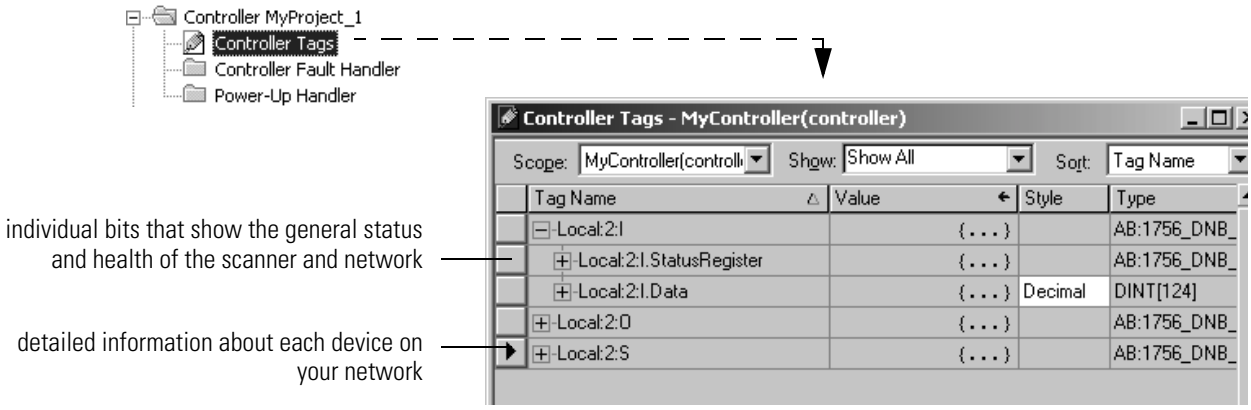
Network (NET) status indicator

State:	Description:	Recommended Action
off	• Device is not online. • The device has not completed the Dup_MAC_ID test. • The device may not be powered.	If the module (MS) indicator is off, turn on power to the controller.
flashing green	Device is OK but is *not* communicating with other devices on the network.	If the device is supposed to communicate with other devices, add those devices to the scan list of this device.
solid green	Device is OK and is communicating with other devices on the network.	None.
flashing red	Communication with at least 1 device has timed out.	Check the status tags of this device to determine which device has timed out.
solid red	Any of the following: • Another device is using the same address. • Communication problems on the network (bus off condition). • Device has an unrecoverable fault and may need to be replaced.	• Make sure the device has a unique address. • Make sure all devices are at the same baud rate. • Cycle power to the device. • For more corrective actions, see status code 91 on page 12-17

In the SoftLogix chassis monitor, the SoftLogix5800 scanner give you the same status indicators as the ControlLogix 1756-DNB. To interpret this indicators, see *ControlLogix Scanner 1756-DNB* on page 12-3.

Status Tags in the Controller

Tags in the controller give you several levels of information about your DeviceNet network.



In the example above, the tags start with Local:2. Your tags may start with a different tag name:

If you have this scanner:	Then the tags start with:
local ControlLogix 1756-DNB	`Local:`*`slot_number_of_scanner`*
remote ControlLogix 1756-DNB	*`name_of_remote_bridge`*`:`*`slot_number_of_scanner`*
CompactLogix 1769-SDN	`Local:`*`slot_number_of_scanner`*
SoftLogix5800 1784-PCIDS	`Local:`*`slot_number_of_scanner`*
DriveLogix/FlexLogix 1788-DNBO	name of the scanner in the I/O configuration of the controller
Linking Device 1788-EN2DN or 1788-CN2DN	name of the linking device in the I/O configuration of the controller

To find the required information:

If you want this information:	Then check the:	See page:
individual bits that show the general status and health of the scanner and network	Status Register	12-14
detailed information about each device on your network	Status Tags	12-15

Status Register

The members of the status register (…I.StatusRegister…), give you the following information:

To determine if:	Check this member:	For a:
scanner is in idle mode	Run	0
scanner is in run mode	Run	1
scanner is *not* faulted	Fault	0
scanner is faulted	Fault	1
scanner is *not* disabled	DisableNetwork	0
scanner is disabled	DisableNetwork	1
scanner is communicating with all the devices	DeviceFailure	0
scanner is *not* communicating with at least 1 device	DeviceFailure	1
data size of each device matches the amount of memory allocated for the device in the scanner:	AutoVerify	0
data size of at least 1 device *does not* match the amount of memory allocated for the device in the scanner:	AutoVerify	1
no network-wide communication problem exists	CommFailure	0
network-wide communication problem exists	CommFailure	1
scanner is on the network at a unique address	DupNodeFail	0
scanner is trying to get on the network at an address that is already in use	DupNodeFail	1
network connector of the scanner has power	DnetPowerDetect	0
network connector of the scanner does *not* have power	DnetPowerDetect	1

Status Tags

The members of the Status tags (…S…), give you the following information:

If you want this information:	**Check this member:**	
	Member:	**Data Type**
count of I/O scans	ScanCounter	DINT
indication that a device is *not* communicating on the network: • There is 1 bit for each address on the DeviceNet network (0 -63). • The position of a bit = address of a device. • If a bit = 1, then the device at that address has failed.	DeviceFailureRegister	SINT[8]
indication that the data size of a device does not match the amount of memory allocated for the device in the scanner: • There is 1 bit for each address on the DeviceNet network (0 -63). • The position of a bit = address of a device. • If a bit = 1, then their is a mismatch with that address.	AutoverifyFailureRegister	SINT[8]
indication that a device is idle: • There is 1 bit for each address on the DeviceNet network (0 -63). • The position of a bit = address of a device. • If a bit = 1, then the device at that address is idle.	DeviceIdleRegister	SINT[8]
indication that a device is online: • There is 1 bit for each address on the DeviceNet network (0 -63). • The position of a bit = address of a device. • If a bit = 1, then the device at that address is online.	ActiveNodeRegister	SINT[8]
ASCII representation of scanner status/display	StatusDisplay	SINT[4]
address of the scanner	ScannerAddress	SINT
status code of scanner	ScannerStatus	SINT
address with an error: • scrolls through the addresses with errors • ScrollingDeviceStatus member shows the status code	ScrollingDeviceAddress	SINT
status code of an address with an error: • scrolls through addresses with errors • ScrollingDeviceAddress member shows the address	ScrollingDeviceStatus	SINT
status code of lower 32 devices – 1 byte per device	DeviceStatus	SINT[32]
status code of all devices – 1 byte per device	DeviceStatus	SINT[64]

Status Codes

Status codes give you detailed information about the status or error of the scanner or another device on the network.

- The status tags for the scanner give you the status codes. Refer to Status Tags on page 12-15.
- Some scanners also show status codes on the front of the scanner.

Use the following table to interpret status codes.

Status code (decimal)	Description	Action
65	The AutoScan option is on and the device is in idle mode.	None.
70	The address of the device is already in use by another device on the network.	Change the address of the device to an unused address.
71	Illegal data in scan list.	Reconfigure the scan list and remove any illegal data.
72	*No* communication with the device.	Inspect the device and verify connections.
73	Device's identity information does not match electronic key in scanner	• Make sure that the correct device is at this address. • Make sure that the device matches the specified electronic key (vendor, product code, product type).
74	Data overrun on port detected.	• Modify your configuration and check for invalid data. • Check network communication traffic.
75	Either or both of the following: • The device does *not* have a scan list. • The device has *not* received communication from any other device	Check that the device has: • scan list • properly wired connection to the network
76	No direct network traffic for scanner.	None. The scanner hears other network communication but does *not* hear any directed to it.
77	During initialization, the data size expected by the device does *not* match the scan list entry.	Check the device and the scan list for the correct input and output size for the device.
78	Device is *not* communicating or communication is intermittent.	• Check that the device has a properly wired connection to the network. • Check that the device has power. • If the device is polled, make sure the interscan delay is long enough for the device to return its data.
79	Scanner has failed to transmit a message.	• Make sure that your scanner is connected to a valid network. • Check for disconnected cables.
80	Scanner is in idle mode.	To run the network: 1. Put controller in run/remote run mode. 2. Turn on the following member of command register for the scanner: …O.CommandRegister.Run

Status code (decimal)	Description	Action
81	Controller has set the scanner to the faulted mode.	See if the following bit of the command register for the scanner is on: …O.CommandRegister.Fault
82	Error detected in sequence of fragmented I/O messages from device.	• Check scan list device to make sure that its input and output data sizes are correct. • Check the configuration of the device.
83	Device returns error responses when the scanner attempts to communicate with it.	• Check the accuracy of the scan list. • Check the configuration of the device. The device may be in another scanner's scan list. • Cycle power to the device.
84	Scanner is initializing the DeviceNet network.	None. This code clears itself once the scanner attempts to initialize all the devices on the network.
85	During runtime, the device is sending the wrong size of data.	Contact Rockwell Automation support. See the back of this publication.
86	Device is in idle state/mode (*not* producing data) while the scanner is in run mode.	• Check the configuration and status of the device. • If you set up an interlock between 2 scanners (controllers), make sure both scanners are in run mode.
88	In shared inputs, the I/O parameters (polled, strobed, etc.) *do not* match between the scanners.	Use the same I/O parameters for the device in both scanners.
89	Scanner failed to configure a device using the Automatic Device Recovery (ADR) parameters	• Make sure that you installed a compatible device. • The offline configuration for the device does not match the actual (online) configuration of the device.
90	Controller has set the scanner to the disabled mode.	See if the following bit of the command register for the scanner is on: …O.CommandRegister.DisableNetwork

91	Bus-off condition (communication problem)	• Cycle power to the device.
		• Make sure all devices are at the same baud rate.
		• Make sure there is *no* short circuit between a CAN line (blue or white) and a power or shield line (black, red, shield).
		• Check for any of the following sources of noise:
		  • Close proximity to a high voltage power cable
		  • Improper or no termination resistor
		  • Improper grounding
		• Check for a device that is producing noise or inappropriate data on the network.

92	The DeviceNet cable is *not* supplying power to the communication port.	• Make sure the network has 24V dc power. • Check the connection to the device.
95	The firmware of the device is currently being updated.	None. Do not disconnect the device while the update is in progress. You will lose any existing data in the device's memory.
96	Communication port is in test mode.	None.

Status code (decimal)	Description	Action
97	Controller has set the scanner to the halted mode.	1. See if the following bit of the command register for the scanner is on: …O.CommandRegister.HaltScanner 2. Cycle power to the scanner.
98	General firmware error.	Replace device.
99	System failure.	Replace device.

Automate the Replacement of a Failed Device

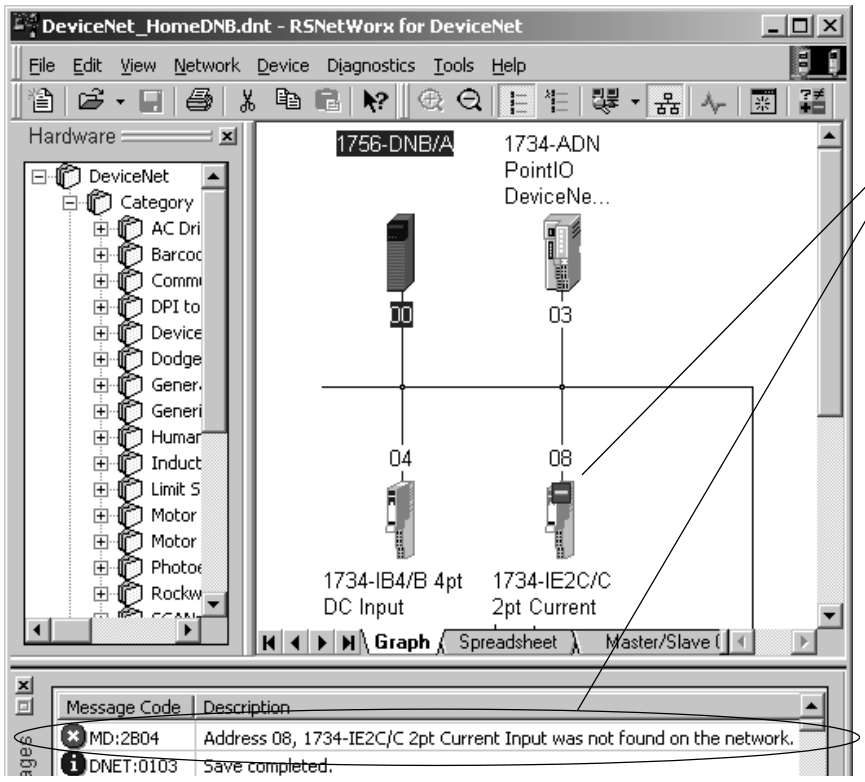
How to Use This Chapter

This chapter describes how to reduce the time it takes to replace a failed device:

How to Automate the Replacement of a Failed Device

To reduce system downtime if a device fails, use the Automatic Device Recovery (ADR) option. With ADR, you *do not* have to use any software tools to get a replacement device configured and online.

IMPORTANT Some devices *do not* support ADR.



With ADR, the scanner automatically configures a replacement part. If the address of the device is set via software, the scanner also sets the address of the replacement device.

You configure ADR on a device-by-device basis. Each device lets you set up the following components of ADR:

If you want to:	And:	Then select this ADR option for the device:
automatically configure a replacement device that matches the electronic key of a failed device	manually change the address of the replacement device	
	automatically set the address of the replacement device to address of the failed device (The device must let you change its address via software.)	
manually configure a replacement device	→	

ATTENTION

If a DeviceNet network has more than one scanner, enable auto-address recovery for only one scanner. If more than one scanner is configured for auto-address recovery, there is no way to determine which scanner will recognize a newly-inserted device on the DeviceNet network.

Set Up Automatic Device Recovery

To set up ADR for a device:

Step:	See page:
❑ Choose an Electronic Key Level for a Device	13-3
❑ Update the Network Configuration File	13-4
❑ Define the Electronic Key	13-5
❑ Enable Auto-Address Recovery for the Scanner	13-6
❑ Set the ADR Settings for the Device	13-6
❑ Download the Changes to the Scanner	13-7
❑ Upload and Save the Network File	13-7

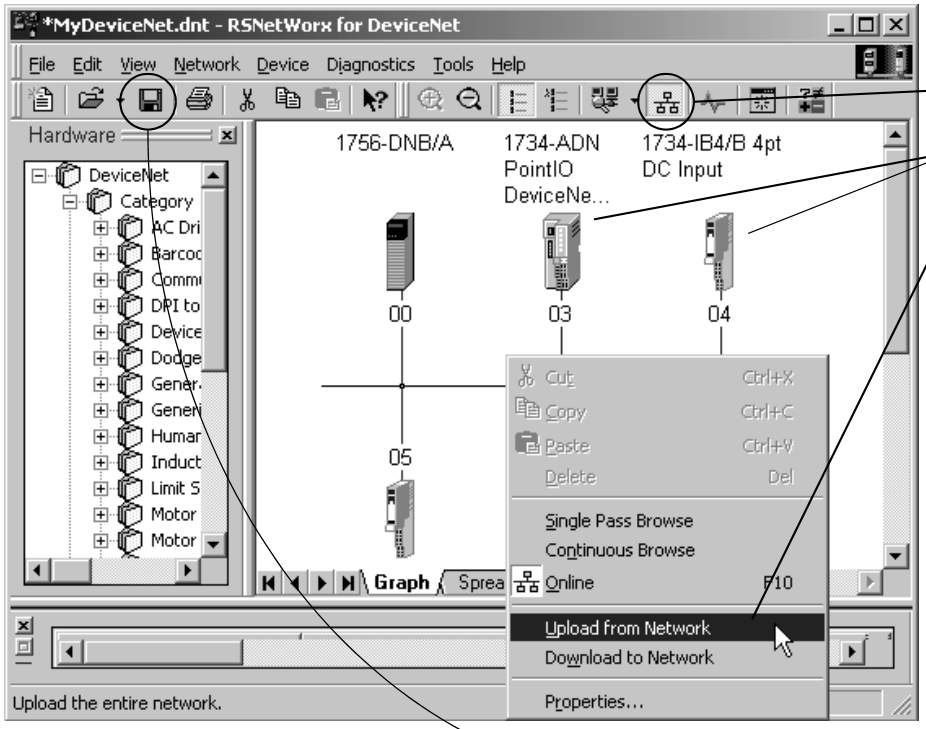
Choose an Electronic Key Level for a Device

Use the electronic key options to define how closely a replacement device must match a failed device before the scanner applies ADR. The scanner only configures/addresses a device that meets the checked items in the electronic key of the failed device.

If multiple devices with the same electronic key fail at the same time, the scanner disables auto-address recovery for those devices. This prevents the scanner from changing the address of the wrong device.

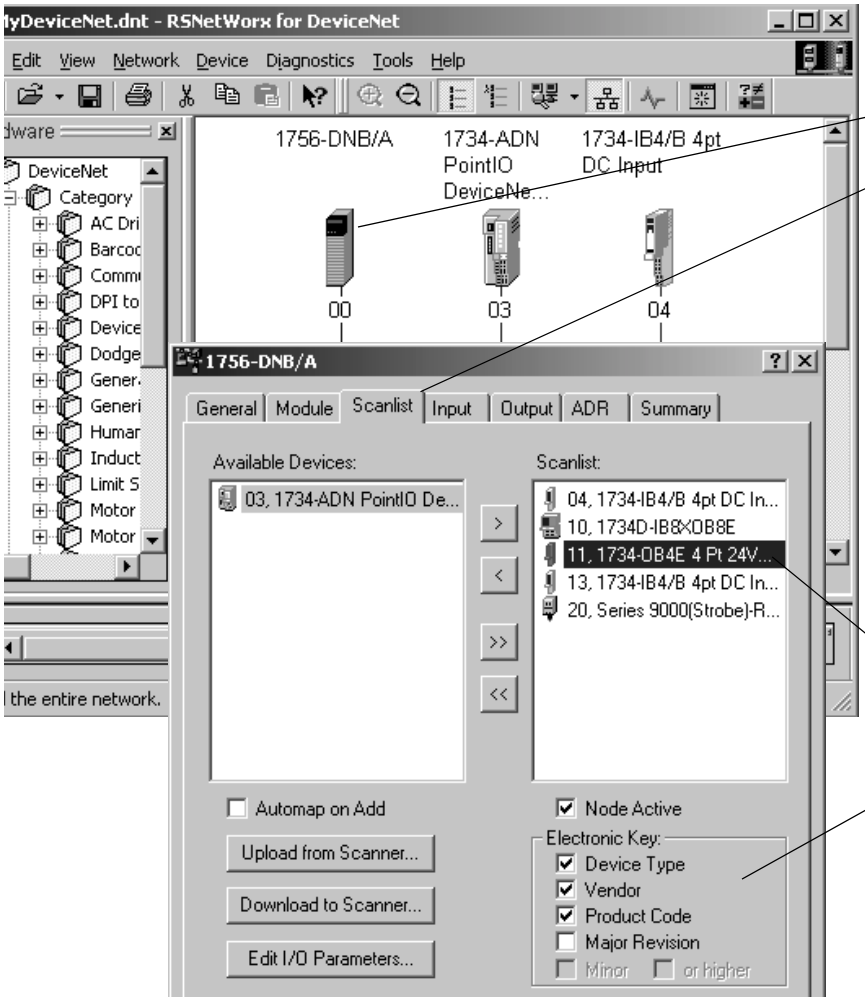
Update the Network Configuration File

When you set up ADR for a device, RSNetWorx reads the configuration for the device from the configuration file and stores it in the scanner. Before you set up ADR for a device, make sure the configuration file is up-to-date.



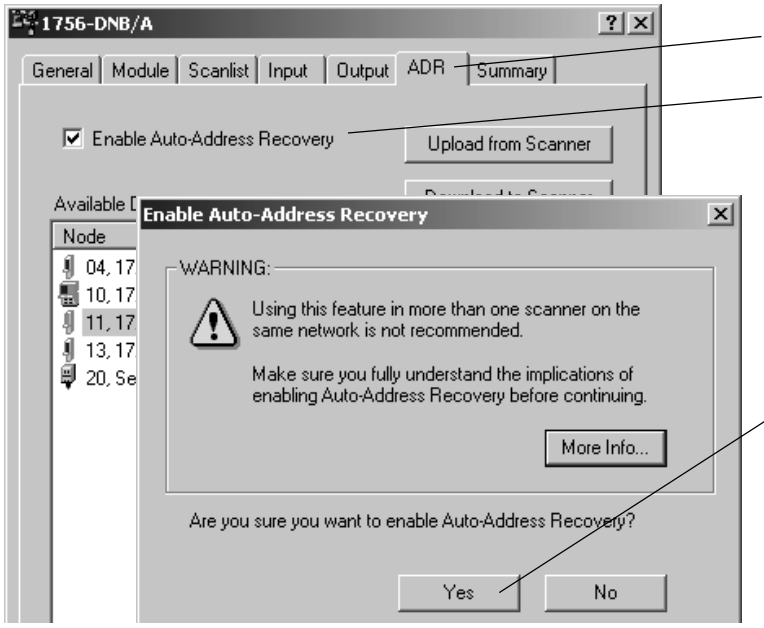
1. Go online.
2. Configure the devices.
3. Right-click and upload the entire network.
4. Save the network configuration.

Define the Electronic Key



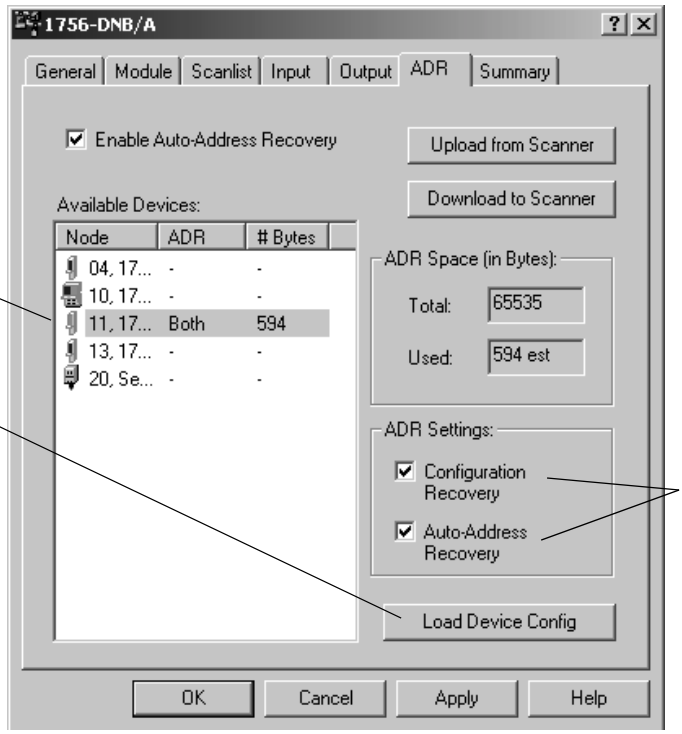
1. Double-click the scanner.
2. Click the *Scanlist* tab.
3. Select the device.
4. Check those items that must match before a replacement device receives the configuration/address of the selected device.

Enable Auto-Address Recovery for the Scanner



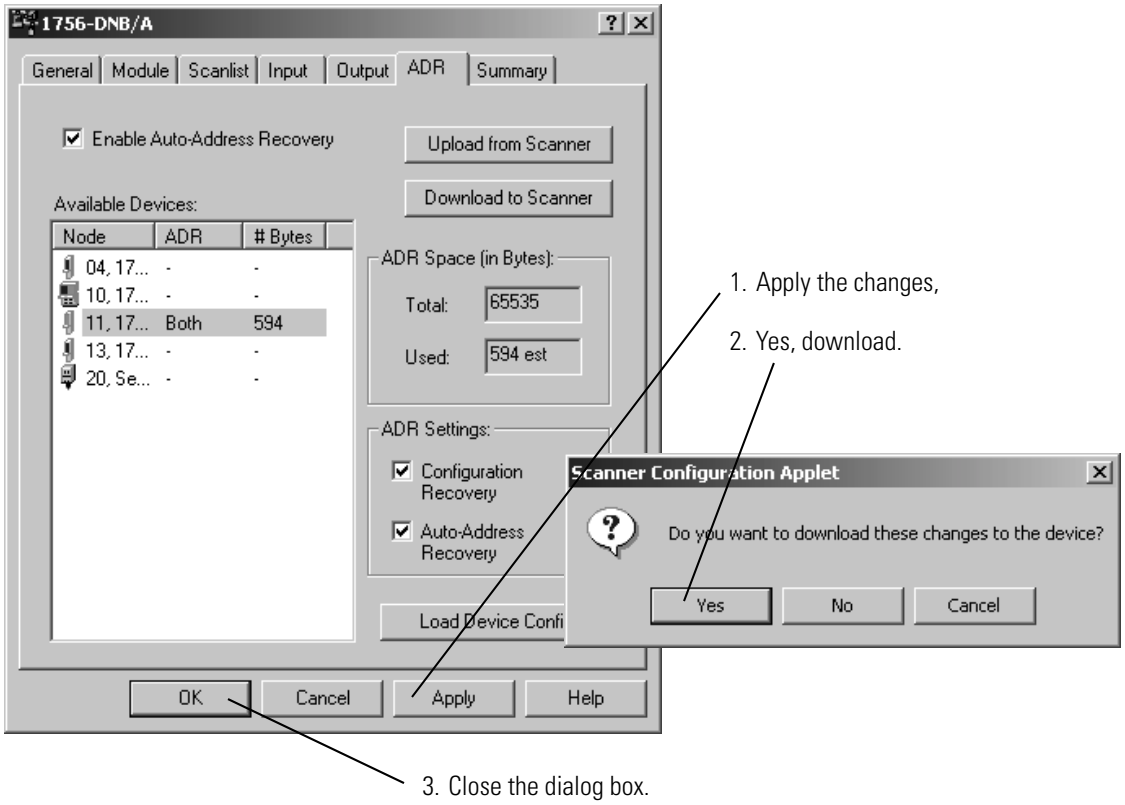
1. Click the *ADR* tab.
2. Enable auto-address recovery.
3. Yes—enable auto-address recover.

Set the ADR Settings for the Device

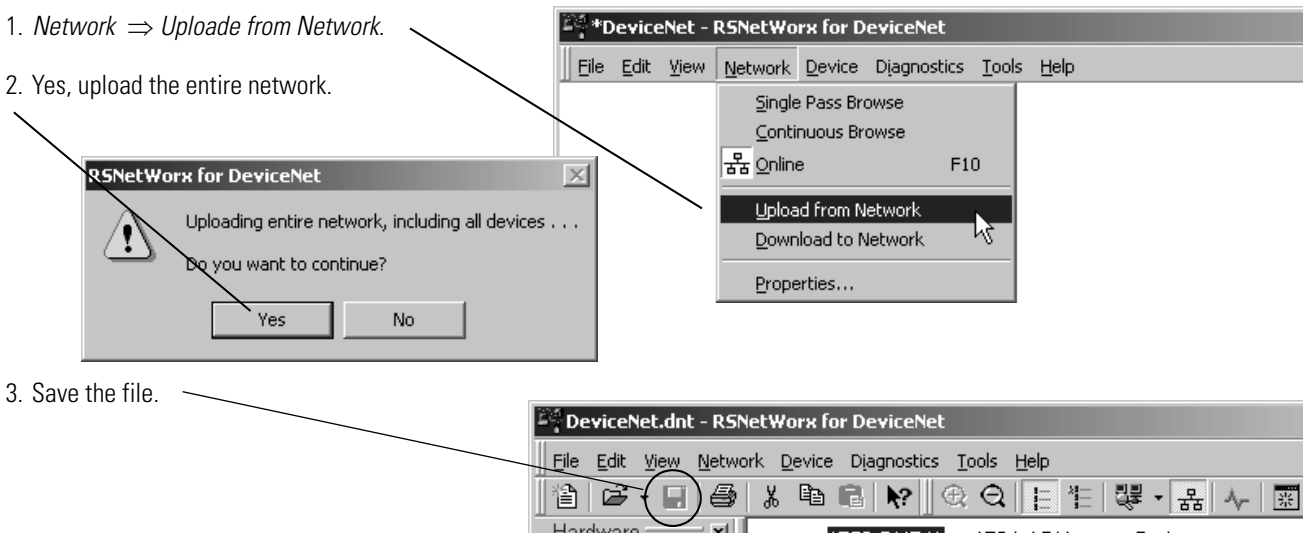


1. Select the device.
2. Send the configuration of the device from the configuration file to the scanner.
3. Select the ADR settings for the device.

Download the Changes to the Scanner



Upload and Save the Network File



Notes:

Using FLEX™ I/O Modules on a DeviceNet Network

How to Use This Chapter

This chapter provides basic information on how to use a Flex I/O adapter 1794-ADN to connect the following I/O modules to a DeviceNet network:

- 1793
- FLEX I/O 1794
- FLEX Ex I/O 1797
- 1203-FM1

To use the Flex I/O adapter 1794-ADN:

Tally Memory Requirements

The Flex I/O adapter 1794-ADN packs the data of its I/O modules into a contiguous block of input or output bytes. By default, the modules share DINT elements in the scanner.

To determine the amount of scanner memory required for your adapter and its I/O modules

1. Add the input bytes of each module + 2 bytes for the adapter.
2. Add the output bytes of each module (0 for the adapter).
3. Add the totals to the main tally.

sub-tally

Device	Input Size of Device (bytes)	Output Size of Device (bytes)
Flex I/O adapter—1794-ADN	2	0
digital output module—1794-OB16	2	2
digital input module—1794-IB16	2	2
Total	6	4

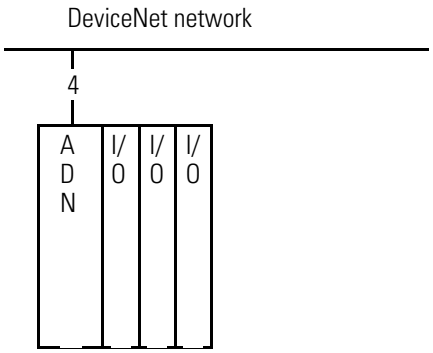
main tally

Device	Address	Input Size of Device (bytes)	Input Memory in Scanner (DINTs)	Output Size of Device (bytes)	Output Memory in Scanner (DINTs)
start/stop buttons		1	1	1	1
motor starter		4	1	4	1
Flex I/O adapter w/ modules		6	2	4	1
	Total				

As an option, give each module its own memory location (DINTs) within the scanner. This may make your programming easier. See *Give a Value Its Own Memory Location* page A-1.

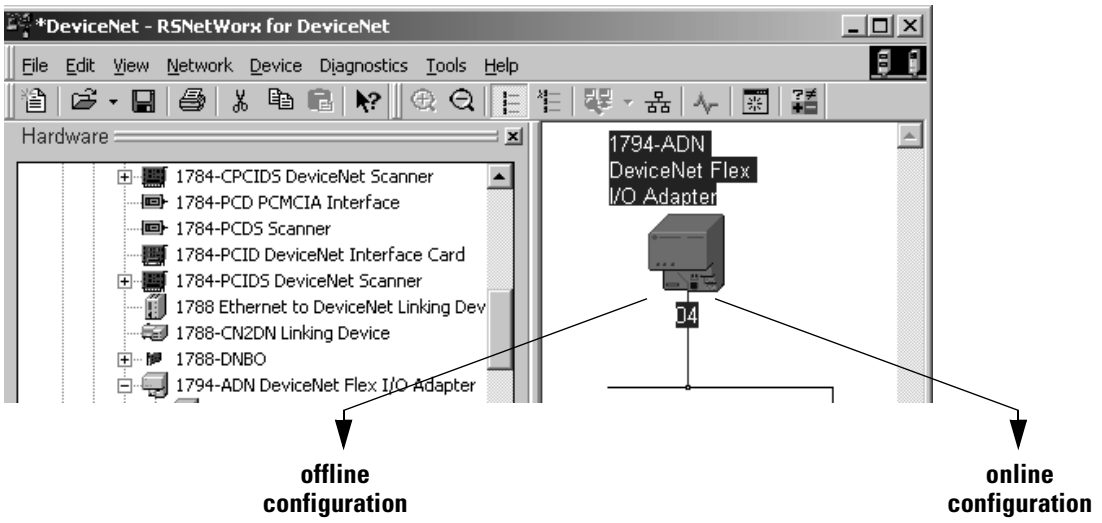
Assign an Address to the Adapter

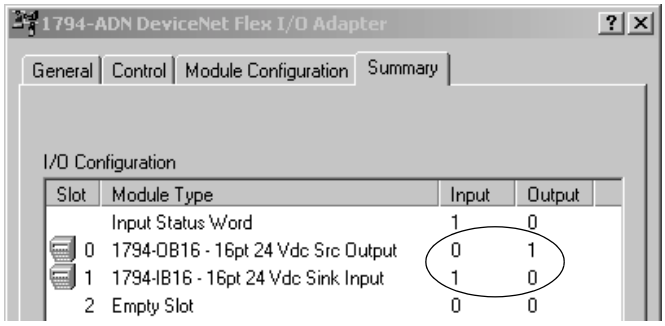
Assign 1 address for the 1794-ADN and all the modules that you connect to it.

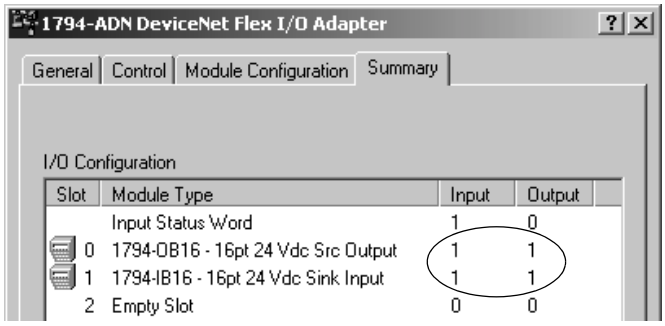


If You Configure the Adapter Offline

If you configure the Flex I/O adapter offline, check the I/O sizes of each module. For Flex I/O, RSNetWorx software uses offline I/O sizes that are different from the default values of the modules.

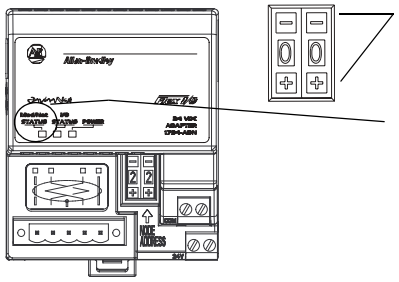






Set the Address of the Adapter

To set the address of the Flex I/O adapter 1794-ADN:



1. To change the address, press the button above or below a number.
2. Connect the adapter to the network.
3. Turn on power to the adapter.
4. Check the Mode/Net STATUS light.

If:	Then the:
green (flashing or solid)	address is OK
solid red	address and/or baud rate conflict with another device
off	device is waiting to set its baud rate When autobaud is on, the device waits until it hears another device on the network. It then sets its baud rate to that of the other device.

If You Change the Configuration of the Adapter

Before you make an online change to a Flex I/O adapter that effects the size of its input or output data, remove the adapter from the scan list of the scanner. Otherwise, RSNetWorx software responds with the following error: Device state conflict.

For example, adding or removing an I/O module to/from the adapter changes the I/O data of the adapter. To add or remove a module:

1. Remove the adapter from the scan list of the scanner.
2. Add or remove the I/O module to/from the adapter and reconfigure the adapter.
3. Add the adapter back into the scan list.

Typically, changes that *do not* effect the I/O size are permitted while the adapter is still in the scan list.

Interpret the Status Indicators

The Flex I/O adapter 1794-ADN has the following status indicators.

Power status indicator

State:	Description:
On	Power applied to module
OFF	No power applied to module. Check power wiring to adapter module.

Module/Network (Mod/Net) status indicator

State:	Description:
OFF	No power, or no network access
Flashing GRN/OFF	On-line, but not connected
Solid GRN	On-line, link okay, connected
Flashing RED	Recoverable fault
Solid RED	Critical adapter failure

I/O status indicator

State:	Description:
OFF	No power, or outputs off
Flashing RED	Recoverable fault - outputs in fault
Flashing GRN/OFF	Idle program mode - outputs in idle
Solid GRN	Device operational - outputs live - run
Solid RED	Critical adapter fault - unrecoverable

Notes:

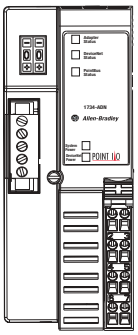
Using POINT™ I/O Modules on a DeviceNet Network

How to Use This Chapter

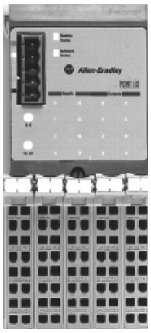
This chapter provides basic information on how to use a POINT I/O modules on a DeviceNet network. To connect the modules to the network, use of the following devices:

POINT I/O Interface 1734-PDN

POINT I/O Adapter 1734-ADN and 1734-ADNX



POINTBlock I/O Module 1734D

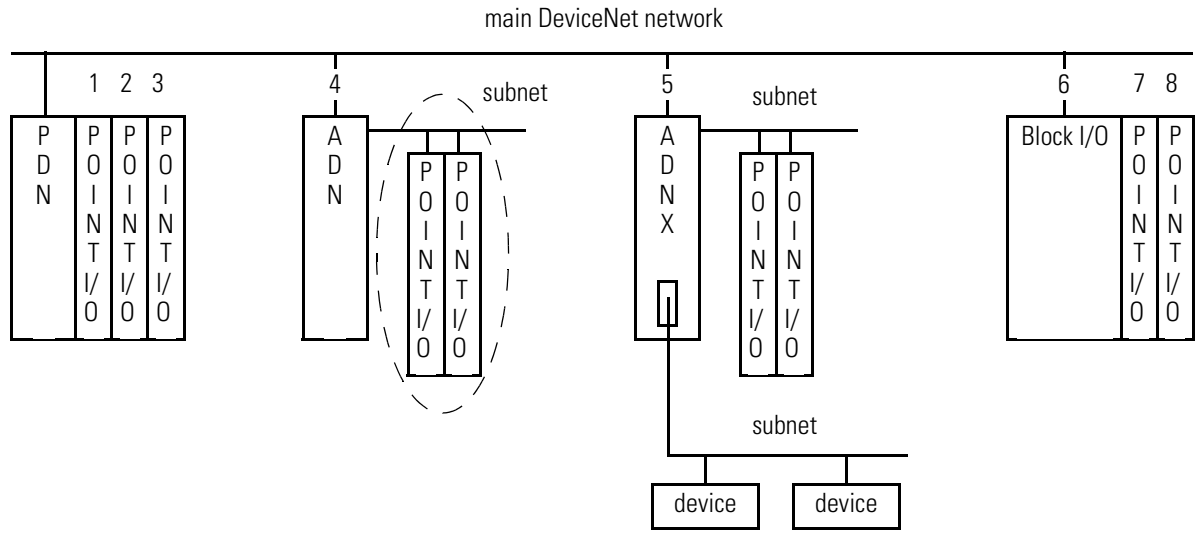


To use POINT I/O on a DeviceNet network:

Choose a Connecting Device

To choose the device that connects your POINT I/O modules to the DeviceNet network, consider the following:

- total number of devices on the network
- type of devices on the network
- topology and length of the network
- current requirements of the POINT I/O modules



- Each I/O module uses an address on the main DeviceNet network.
- Total current requirements of the I/O modules must be 1.3A or less.

- Consolidates the I/O module into a single address on the main DeviceNet network.
- Total current requirements of I/O modules can be greater than 1.3A.

The subnet lets you:

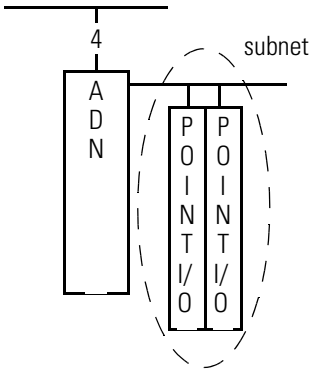
- connect other types of DeviceNet devices to the subnet
- Place devices beyond the limits of the main DeviceNet network

If you are also using a POINTBlock I/O module, connect your other POINT I/O modules to that module.

Tally Memory Requirements

POINT I/O modules connect to an adapter or interface module. To tally their memory requirements:

For this module:	See page:
POINT I/O 1734-ADN or 1734-ADNX Adapter	15-3
POINT I/O 1734-PDN Interface	15-4



POINT I/O 1734-ADN or 1734-ADNX Adapter

The ADN/ADNX adapter creates a small network (subnet) out of the modules and devices that are connected to it. You can configure the adapter to give each device on the subnet its own DINT or DINTs, which works best for a Logix5000 system.

To tally the memory requirements for POINT I/O:

1. Determine how many bytes each device sends and/or gets to/from your control system.
   The adapter itself sends 2 bytes and gets 2 bytes.
2. Convert the input and output sizes to DINTs in the scanner.

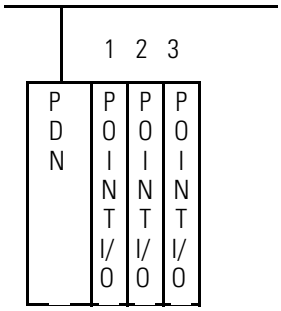
sub-tally

Device	Input Size of Device (bytes)	Input Memory in Scanner (DINTs)	Output Size of Device (bytes)	Output Memory in Scanner (DINTs)
Point I/O adapter-ADN	2	1	2	1
Point I/O input-IE2C	6	2	0	0
Point I/O output-OB4E	1	1	1	1
	Total	4		2

3. Add the totals to the main tally.

main tally

Device	Address	Input Size of Device (bytes)	Input Memory in Scanner (DINTs)	Output Size of Device (bytes)	Output Memory in Scanner (DINTs)
start/stop buttons		1	1	1	1
motor starter		4	1	4	1
POINT I/O adapter w/ modules			4		2



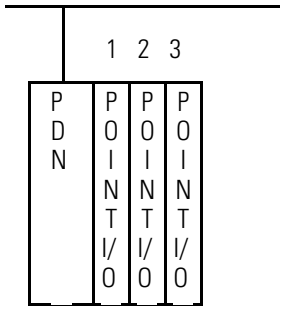
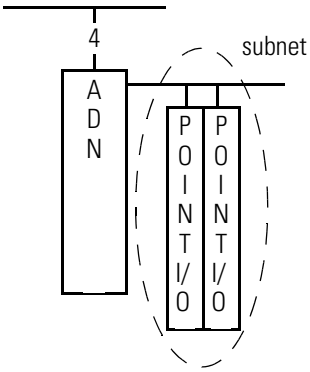
POINT I/O 1734-PDN Interface

Each POINT I/O module gets its own address on the network and requires scanner memory:

1. Add each POINT I/O module to your main tally.
2. Make sure to convert the input or output size of each module to DINTs of scanner memory.
3. Leave the PDN interface *out* of the tally. It *does not* get an address or use scanner memory

Assign Addresses to the Modules

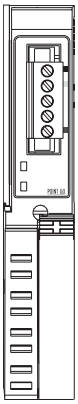
Assign address to POINT I/O module as follows:

If you connect the modules to a:	Then:
POINT I/O interface 1734-PDN or POINTBlock I/O module 1734D 	1. Assign an address to each POINT I/O module. 2. *Do not* assign an address to the PDN interface.
POINT I/O 1734-ADN or 1734-ADNX adapter 	1. Assign an address only to the ADN/ADNX adapter. 2. *Do not* assign an address any of the modules/devices that are connected to the ADN/ADNX adapter. When you configure the ADN/ADNX adapter, use the AutoStart parameter to automatically give an address to each device on the subnet.

Set the Address of a Module

The following sections show how to set the address of specific devices.

For this device:	See page:
POINT I/O Interface 1734-PDN	15-5
POINT I/O Module 1734	15-5
POINT I/O Adapter 1734-ADN and 1734-ADNX	15-6
POINTBlock I/O Module 1734D	15-6



POINT I/O Interface 1734-PDN

The 1734-PDN module does *not* use an address on the network. (Each 1734 POINT I/O module that is connected to the PDN module gets its own address on the network.)

POINT I/O Module 1734

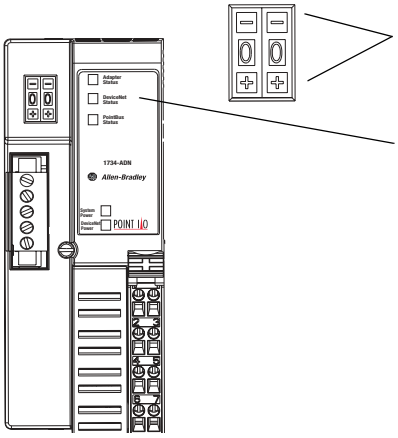
Depending on how you connect the module to the network, you may or may not have to set its address:

If the module connects to the network via a:	Then:
1734-ADN or ADNX adapter	The module requires *no* address on the network.
1734-PDN interface 1734D POINTBlock I/O module	Use RSNetWorx software to set the address of the left-most I/O module (first I/O module to the right of the PDN or POINTBlock module). To configure the left-most module to automatically set the addresses of the other I/O modules that are connected to it, see *Automatically Sequence Point I/O Addresses* on page 15-7.

If you set the address of the module at this time, check the Network Status light.

If:	Then the:
green (flashing or solid)	address is OK
solid red	address and/or baud rate conflict with another device
off	device is waiting to set its baud rate When autobaud is on, the device waits until it hears another device on the network. It then sets its baud rate to that of the other device.

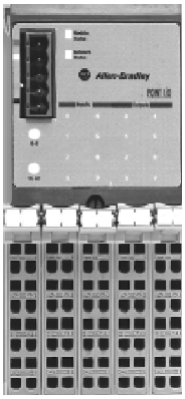
POINT I/O Adapter 1734-ADN and 1734-ADNX



1. To change the address, press the button above or below a number.
2. Connect the adapter to the network.
3. Turn on power to the adapter.
4. Check the DeviceNet Status light.

If:	Then the:
green (flashing or solid)	address is OK
solid red	address and/or baud rate conflict with another device
off	device is waiting to set its baud rate When autobaud is on, the device waits until it hears another device on the network. It then sets its baud rate to that of the other device.

POINTBlock I/O Module 1734D



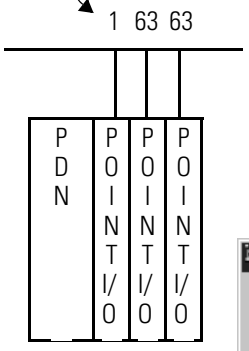
1. Set the address using the switches on the front of the module.
2. Connect or disconnect and reconnect the module to the DeviceNet network.
3. Check the Network Status light.

If:	Then the:
green (flashing or solid)	address is OK
solid red	address and/or baud rate conflict with another device
off	device is waiting to set its baud rate When autobaud is on, the device waits until it hears another device on the network. It then sets its baud rate to that of the other device.

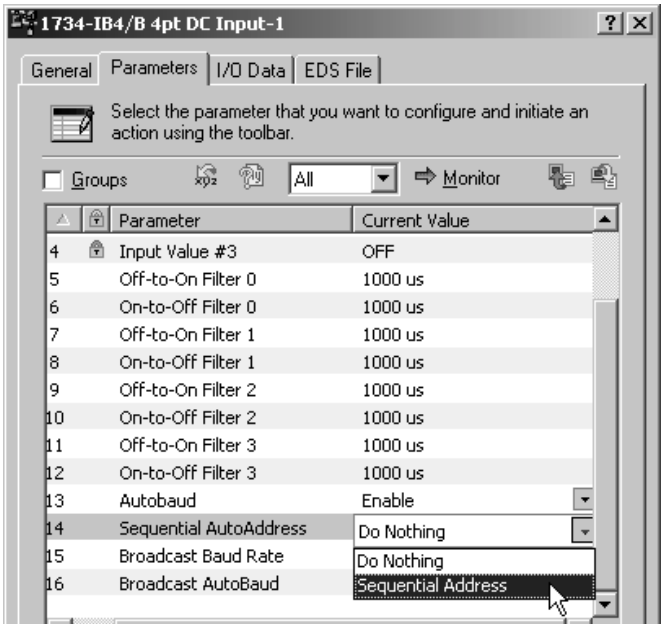
Automatically Sequence Point I/O Addresses

If you connect Point I/O modules to a 1734-PDN interface, use the left-hand module to set the addresses of the modules to its right in the group:

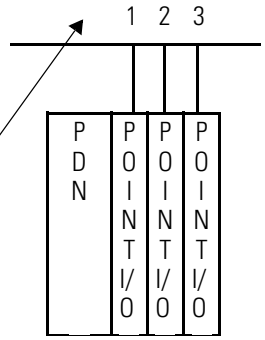
1. Set the address of the left-most I/O module. Refer to Set an Address with Software on page 5-3.



2. When you configure the left-most I/O module, set Sequential AutoAddress = *Sequential Address*. The next chapter shows you how to do this.



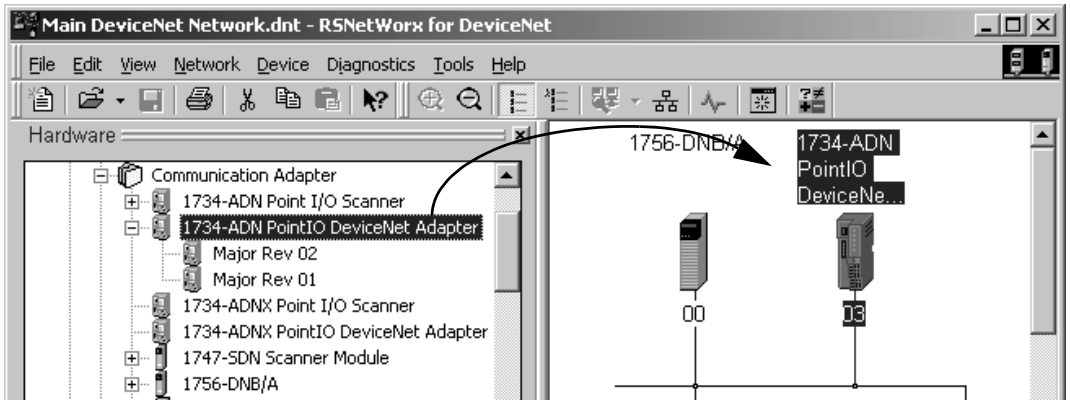
The module sequences the rest of the modules to its right in the group.



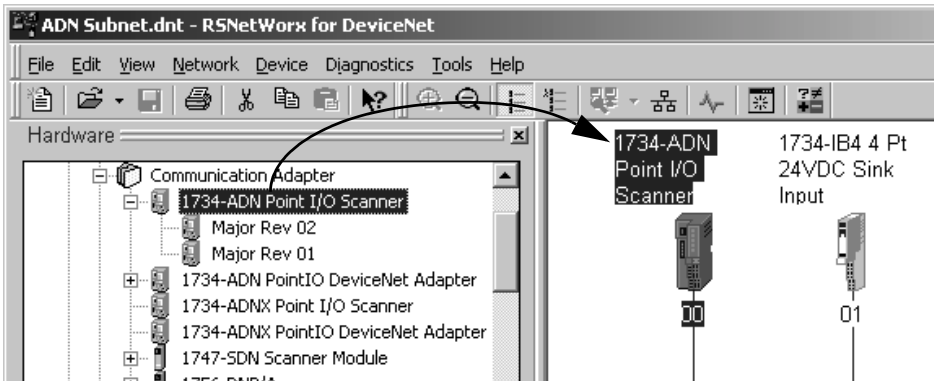
Configure a Point I/O Adapter

The POINT I/O adapter (1734-ADN or 1734-ADNX) functions as follows:

On the main DeviceNet network, the 1734-ADN or 1734-ADNX device is an adapter.



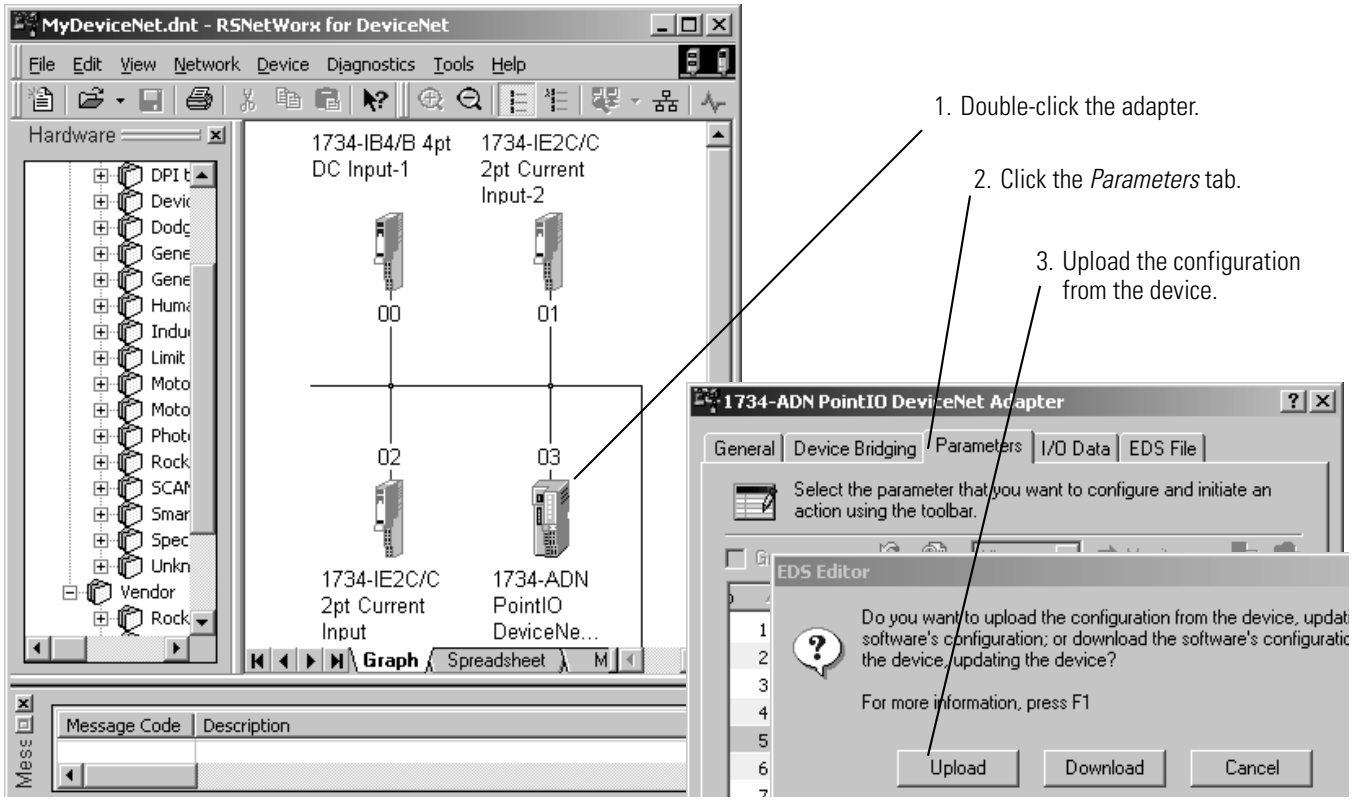
On the subnet, the 1734-ADN or 1734-ADNX device is the scanner.



To configure a POINT I/O adapter (1734-ADN or 1734-ADNX):

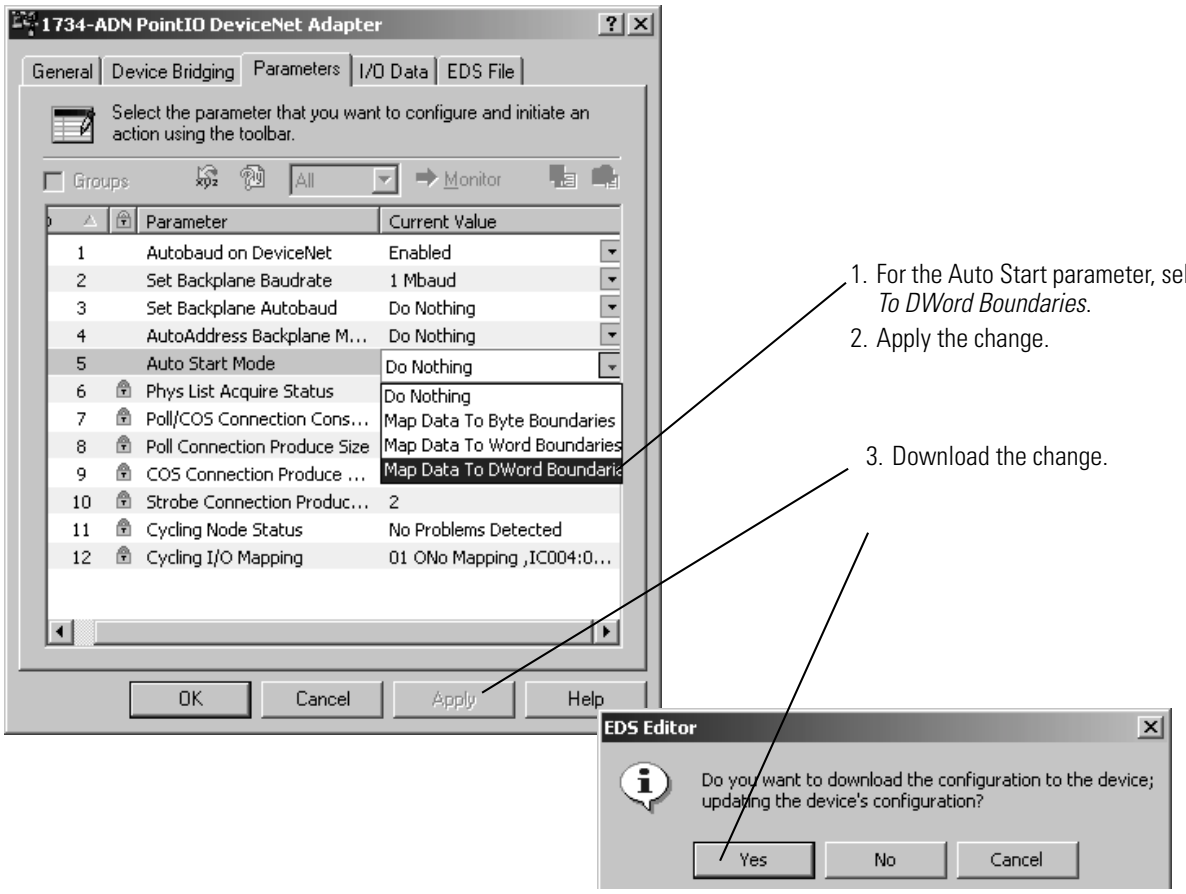
Step:	See page:
❑ Upload the Configuration of the ADN/ADNX Adapter	15-9
❑ Configure the Adapter to Execute an Auto Start	15-10
❑ Create a File for the Subnet	15-11
❑ Access the Subnet	15-11
❑ Upload the Subnet Configuration and Save It to a File	15-12
❑ Specify the Subnet File in the Configuration of the Adapter	15-12

Upload the Configuration of the ADN/ADNX Adapter

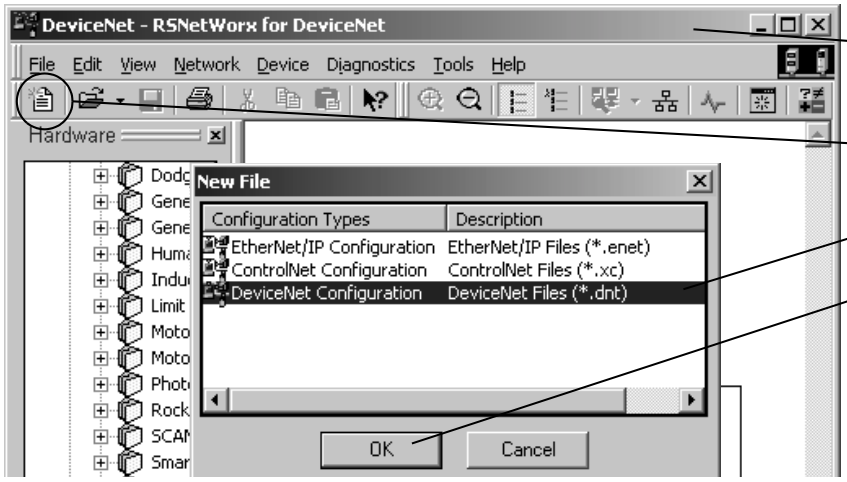


Configure the Adapter to Execute an Auto Start

The Auto Start Mode parameter, does a one-time configuration of the subnet. If you add devices to the subnet after you execute auto start, execute auto start again.

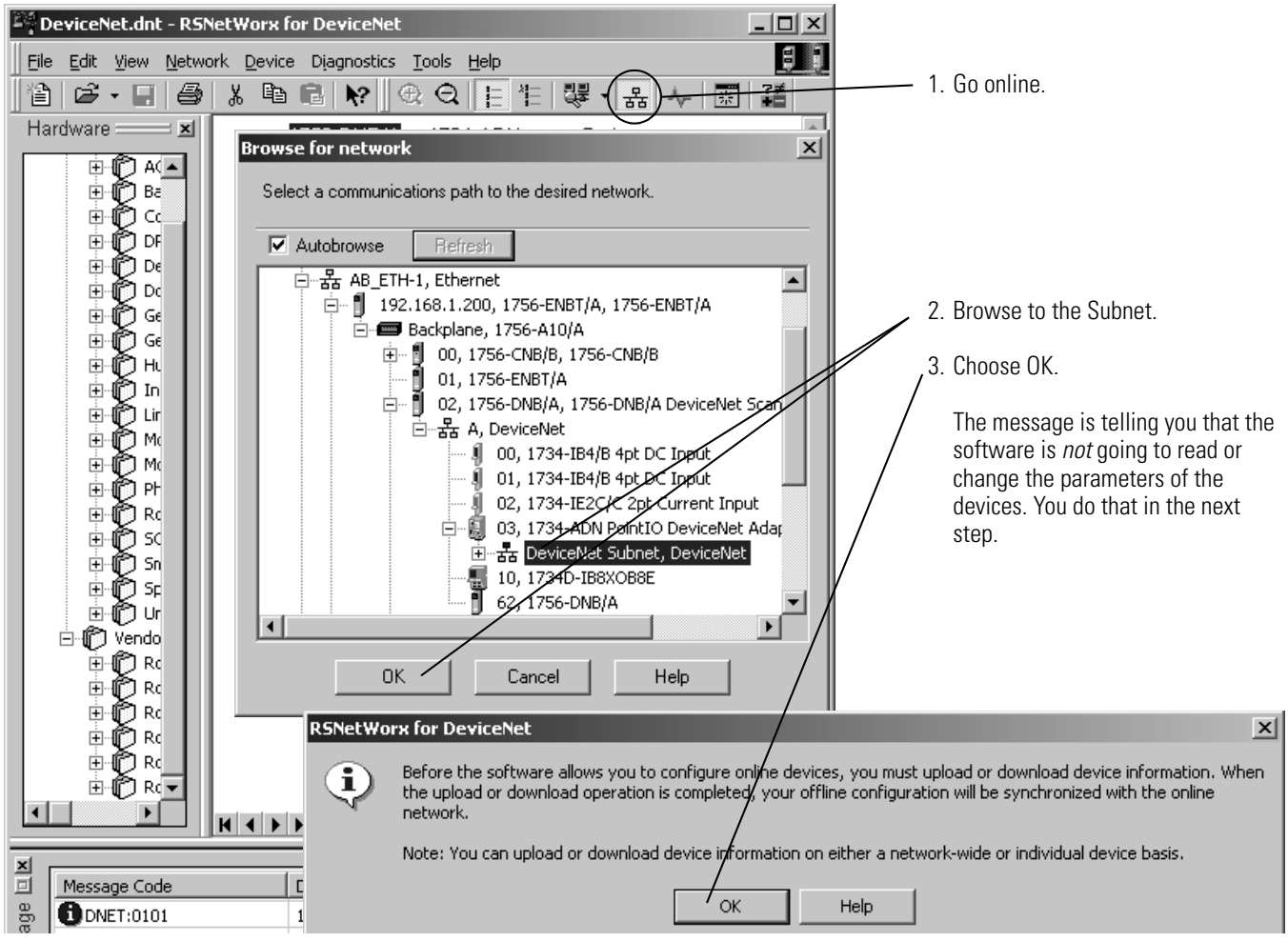


Create a File for the Subnet



1. Start another instance of RSNetWorx software.
2. Create a file.
3. Select *DeviceNet Configuration*.
4. Choose OK.

Access the Subnet

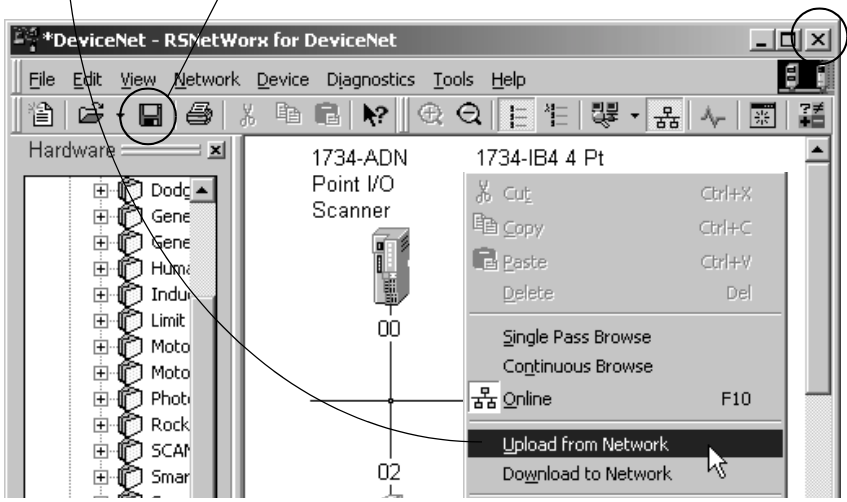


1. Go online.
2. Browse to the Subnet.
3. Choose OK.

   The message is telling you that the software is *not* going to read or change the parameters of the devices. You do that in the next step.

Upload the Subnet Configuration and Save It to a File

1. Right-click and upload the entire network.
2. Save the file and give it a name that identifies it as the ADN or ADNX subnet configuration.

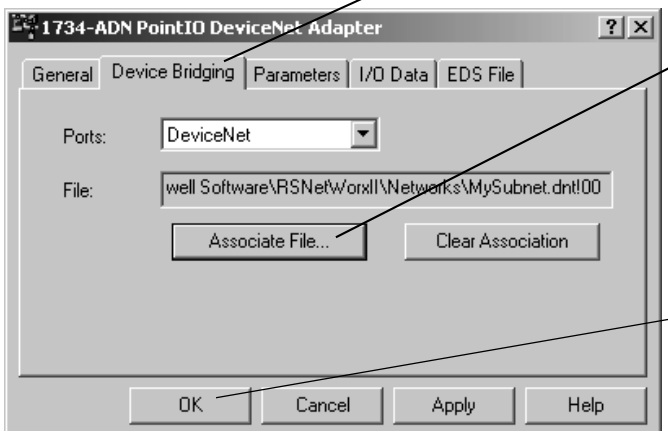


3. Close this instance of RSNetWorx software.

Specify the Subnet File in the Configuration of the Adapter

After you configure the subnet, define it as the associated network for the adapter. This lets the adapter pull the I/O data from the subnet and use it to define the I/O parameters of the adapter on the main DeviceNet network

1. In the original instance of RSNetWorx software, click the *Device Bridging* tab of the ADN/ADNX adapter.



2. Click the *Associate File* button and select the file that you just created for the subnet.
3. Close the dialog box.

To access the subnet from the main network, right-click on the adapter and choose *Associated Network*.

If You Change the Configuration of the Adapter

Before you make an online change to a POINT I/O adapter 1734-ADN/1734-ADNX that effects the size of its input or output data, remove the adapter from the scan list of the scanner. Otherwise, RSNetWorx software responds with the following error: Device state conflict.

For example, adding or removing an I/O module to/from the adapter changes the I/O data of the adapter. To add or remove a module:

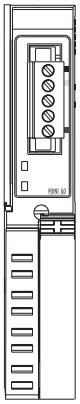
1. Remove the adapter from the scan list of the scanner.
2. Add or remove the I/O module to/from the adapter and reconfigure the adapter.
3. Add the adapter back into the scan list.

Typically, changes that *do not* effect the I/O size are permitted while the adapter is still in the scan list.

Interpret the Status Indicators

For this device:	See page:
POINT I/O Interface 1734-PDN	15-13
POINT I/O Module 1734	15-14
POINT I/O Adapter 1734-ADN and 1734-ADNX	15-14
POINTBlock I/O Module 1734D	15-17

POINT I/O Interface 1734-PDN



System Power indicator

State	Description
off	Either: • DeviceNet power is off, or • dc-dc converter problem.
green	• System power is on. • dc-dc converter is active (5V).

DeviceNet Power indicator

State:	Probable Cause:
off	DeviceNet power is off.
green	Power on, 24V present

POINT I/O Module 1734

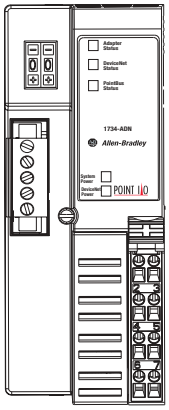
Module Status indicator

State	Description
off	No power applied to device
green	Device operating normally
flashing green	Device needs commissioning due to configuration missing, incomplete or incorrect.
flashing red	Recoverable fault.
red	Unrecoverable fault may require device replacement
flashing red/green	Device is in self-test

Network Status indicator

State	Description
off	Device is not on-line • Device has not completed dup_MAC_id test. • Device not powered - check module status indicator
flashing green	Device is on-line but has no connections in the established state.
green	Device on-line and has connections in the established state.
flashing red	One or more I/O connections in timed-out state
red	Critical link failure - failed communication device. Device detected error that prevents it communicating on the network.
flashing red/green	Communication faulted device - the device has detected a network access error and is in communication faulted state. Device has received and accepted an Identify Communication Faulted Request - long protocol message.

POINT I/O Adapter 1734-ADN and 1734-ADNX



Adapter Status indicator

State	Description	Recommended Action
off	No power applied to device	Power the adapter
solid green	Device operating normally	None
flashing green	Device needs to be commissioned because configuration is missing, incomplete or incorrect	Check configuration and recommission the adapter

State	Description	Recommended Action
flashing red	Recoverable fault	Make sure the adapter does not need a FLASH update
solid red	Unrecoverable fault may require device replacement	Replace the adapter
flashing red/green	Device is in self-test	Wait for self-test to finish

DeviceNet Status indicator

State	Description	Recommended Action
off	Device is not online • Device is autobauding • Device has not completed dup_MAC_id test • Device not powered	Check adapter status indicator to determine if more time is needed to complete the dup_MAC_id test or if the adapter needs to be powered
flashing green	Device is on-line but has no connections in the established state	None
solid green	Device on-line and has connections in the established state	None
flashing red	One or more I/O connections in timed-out state	Determine the cause of the time-out. The EPR may need to be increased
solid red	Critical link failure - failed communication device. Device detected error that prevents it communicating on the network.	Make sure the device is using the correct MAC ID and baud rate

Subnet Status or PointBus Status indicator

State	Description	Recommended Action
off	Device is not on-line • Device has not completed Dup_MAC_ID test. • Device not powered - check module status indicator	Check adapter status indicator to determine if more time is needed to complete the dup_MAC_id test or if the adapter needs to be powered
flashing green	Device is online but has no connections in the established state	None
solid green	Device on-line and has connections in the established state.	None
flashing red	No scan list is available. I/O module is missing.	Make sure all I/O modules are connected and using the correct MAC IDs. Check "Cycling Node Status" parameter in RSNetWorx for DeviceNet.
solid red	Critical link failure - failed communication device. Device detected error that prevents it communicating on the network.	Make sure an I/O module is not using a MAC ID =0. Make sure all backplane modules are communicating at the proper baud rate.

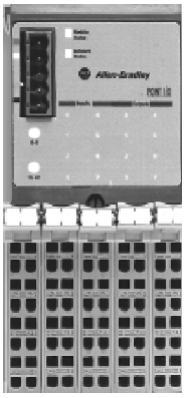
System Power indicator

State	Description	Recommended Action
off	Any of the following: • Not active • Field power is OFF • DC-DC converter problem	 • Check adapter configuration • Turn field power ON • Check DC-DC converter
green	Any of the following: • System power ON • DC-DC converter active (5V)	None

Field Power indicator

State	Description	Recommended Action
off	Any of the following: • Not active • Field power is OFF	• Check adapter configuration • Turn field power ON
green	Power ON, 24V present	None

POINTBlock I/O Module 1734D



Module Status indicator

State	Description
off	No power applied to device
green	Device operating normally
flashing green	Device needs commissioning due to configuration missing, incomplete or incorrect.
flashing red	Recoverable fault.
red	Unrecoverable fault may require device replacement
flashing red/green	Device is in self-test

Network Status indicator

State	Description
off	Device is not on-line • Device has not completed dup_MAC_id test. • Device not powered - check module status indicator
flashing green	Device is on-line but has no connections in the established state.
green	Device on-line and has connections in the established state.
flashing red	One or more I/O connections in timed-out state
red	Critical link failure - failed communication device. Device detected error that prevents it communicating on the network.
flashing red/green	Communication faulted device - the device has detected a network access error and is in communication faulted state. Device has received and accepted an Identify Communication Faulted Request - long protocol message.

Interpret POINT I/O Data (Data Maps)

I/O messages are sent to (consumed) and received from (produced) the POINT I/O modules. These messages are mapped into the processor's memory. This appendix lists the default data maps for 1734 POINT I/O and 1734-POINTBlock modules.

1734-IA2 Input Module

Message size: 1 Byte

	7	6	5	4	3	2	1	0
Produces (scanner Rx)							Ch1	Ch0
Consumes (scanner Tx)	No consumed data							

Where: Ch0 = channel 0, Ch1 = channel 1; 0 = off, 1 = on

1734-IB2 Sink Input Module

Message size: 1 Byte

	7	6	5	4	3	2	1	0
Produces (scanner Rx)							Ch1	Ch0
Consumes (scanner Tx)	No consumed data							

Where: Ch0 = channel 0, Ch1 = channel 1; 0 = OFF 1 = ON

1734-IB4 Sink Input Module

Message size: 1 Byte

	7	6	5	4	3	2	1	0
Produces (scanner Rx)					Ch3	Ch2	Ch1	Ch0
Consumes (scanner Tx)	No consumed data							

Where: Ch0 = input channel 0 Ch1 = input channel 1 Ch2 = input channel 2 Ch3 = channel 3
0 = OFF 1 = ON

1734-IV2 Source Input Module

Message size: 1 Byte

	7	6	5	4	3	2	1	0
Produces (scanner Rx)							Ch1	Ch0
Consumes (scanner Tx)	No consumed data							

Where: Ch0 = input channel 0 data Ch1 = input channel 1 data

1734-IV4 Source Input Module

Message size: 1 Byte

	7	6	5	4	3	2	1	0
Produces (scanner Rx)					Ch3	Ch1	Ch1	Ch0
Consumes (scanner Tx)	No consumed data							

Where: Ch0 = input channel 0 Ch1 = input channel 1 Ch2 = input channel 2 Ch3 = input channel 3

1734-OA2 Output Module

Message size: 1 Byte

	7	6	5	4	3	2	1	0	
Produces (scanner Rx)	No produced data								
Consumes (scanner Tx)	Not used						Ch1	Ch0	Channel state
Where: 0 = Off, 1 = On									

1734-OB2E Electronically Protected Output Module

Message size: 1 Byte

	7	6	5	4	3	2	1	0	
Produces (scanner Rx)	Not used						Ch1	Ch0	Channel status

Where: 0 = no error 1 = error

Message size: 1 Byte

	7	6	5	4	3	2	1	0	
Consumes (scanner Tx)	Not used						Ch1	Ch0	Channel state

Where: 0 = OFF 1 = ON

1734-OB2EP Protected Output Module

Message size: 1 Byte

	7	6	5	4	3	2	1	0	
Produces (scanner Rx)	Not used						Ch1	Ch0	Channel status

Where: 0 = no error 1 = error

Message size: 1 Byte

	7	6	5	4	3	2	1	0	
Consumes (scanner Tx)	Not used						Ch1	Ch0	Channel state

Where: 0 = OFF 1 = ON

1734-OB4E Electronically Protected Output Module

Message size: 1 Byte

	7	6	5	4	3	2	1	0	
Produces (scanner Rx)	Not used				Ch3	Ch2	Ch1	Ch0	Channel status

Where: 0 = no error 1 = error

Message size: 1 Byte

	7	6	5	4	3	2	1	0	
Consumes (scanner Tx)	Not used				Ch3	Ch2	Ch1	Ch0	Channel state
Where: 0 = Off 1 = On									

1734-OV2E Protected Sink Output Module

Message size: 1 Byte

	7	6	5	4	3	2	1	0	
Produces (scanner Rx)	Not used						Ch1	Ch0	Channel status
Where:0 = no error 1 = error									

Message size: 1 Byte

	7	6	5	4	3	2	1	0	
Consumes (scanner Tx)	Not used						Ch1	Ch0	Channel state
Where:0 = OFF 1 = ON									

1734-OV4E Protected Sink Output Module

Message size: 1 Byte

	7	6	5	4	3	2	1	0	
Produces (scanner Rx)	Not used				Ch3	Ch2	Ch1	Ch0	Channel status
Where:0 = no error 1 = error									

Message size: 1 Byte

	7	6	5	4	3	2	1	0	
Consumes (scanner Tx)	Not used				Ch3	Ch2	Ch1	Ch0	Channel state
Where:0 = OFF 1 = ON									

1734-OW2 Relay Sink/Source Output Module

Message size: 1 Byte

	7	6	5	4	3	2	1	0	
Consumes (scanner Tx)	Not used						Ch1	Ch0	Channel state

Where: 0 = OFF 1 = ON

1734-OX2 Relay Output Module

Message size: 1 Byte

	7	6	5	4	3	2	1	0	
Consumes (scanner Tx)	Not used						Ch1	Ch0	Channel state

Where: 0 = NO contact OFF, NC contact ON1 = NO contact ON, NC contact OFF

1734-IE2C Analog Current Input Module

Message size: 6 Bytes

	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
Produces (scanner Rx)	Input Channel 0 High Byte								Input Channel 0 Low Byte							
	Input Channel 1 High Byte								Input Channel 1 Low Byte							
	Status Byte for Channel 1								Status Byte for Channel 0							
	OR	UR	HHA	LLA	HA	LA	CM	CF	OR	UR	HHA	LLA	HA	LA	CM	CF
Consumes (scanner Tx)	No consumed data															

Where:CF = Channel Fault status0 = no error1 = fault

CM = Calibration Mode0 = normal1 = calibration mode

LA = Low Alarm0 = no error1 = fault

HA = High Alarm0 = no error1 = fault

LLA = Low/Low Alarm0 = no error1 = fault

HHA = High/High Alarm0 = no error1 = fault

UN = Underrange0 = no error1 = fault

OR = Overrange0 = no error1 = fault

Channel Status

Table 15.1
Channel Status Byte

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Over Range	Under Range	High High Alarm	Low Low Alarm	High Alarm	Low Alarm	CAL Mode	Channel Fault

1734-IE2V Analog Input Module

Message size: 6 Bytes

	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
Produces (scanner Rx)	Input Channel 0 - High Byte								Input Channel 0 - Low Byte							
	Input Channel 1 - High Byte								Input Channel 1 - Low Byte							
	Status Byte for Channel 1								Status Byte for Channel 0							
	OR	UR	HHA	L LA	HA	LA	CM	CF	OR	UR	HHA	L LA	HA	LA	CM	CF
Consumes (scanner Tx)	No consumed data															

Where:CF = Channel Fault status; 0 = no error, 1 = fault

CM = Calibration Mode; 0 = normal, 1 = calibration mode

LA = Low Alarm; 0 = no error, 1 = fault

HA = High Alarm; 0 = no error, 1 = fault

LLA = Low/Low Alarm; 0 = no error, 1 = fault

HHA = High/High Alarm; 0 = no error, 1 = fault

UR = Underrange; 0 = no error, 1 = fault

OR = Overrange; 0 = no error, 1 = fault

1734-OE2C Analog Current Output Module

Message size: 4 bytes

	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
Consumes (Tx)	Output Channel 0 High Byte								Output Channel 0 Low Byte							
	Output Channel 1 High Byte								Output Channel 1 Low Byte							

Message size: 2 Bytes

	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
Produces (Rx)	High Byte - Channel 1 Status								Low Byte - Channel 0 Status							
	Not used				HCA	LCA	CM	CF	Not used				HCA	LCA	CM	CF

Where:CF = Channel Fault status0 = no error1 = fault

CM = Calibration Mode0 = normal1 = calibration mode

LCA = Low Clamp Alarm0 = no error1 = fault

HCA = High Clamp Alarm0 = no error1 = fault

Channel Status

Table 15.2
Channel Status Byte

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Not used				High Clamp	Low Clamp	CAL Mode	Channel Fault

1734-OE2V Analog Output Module

Message size: 2 Bytes

	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
Produces (scanner Rx)	Channel 1 Status - High Byte								Channel 0 Status - Low Byte							
	Not used				HCA	LCA	CM	ST	Not used				HCA	LCA	CM	ST

Where:ST = Channel Fault Status; 0 = no error, 1 = fault

CM = Calibration Mode; 0 = normal, 1 = calibration mode

LCA = Low Clamp Alarm; 0 = no error, 1 = fault

HCA = High Clamp Alarm; 0 = no error, 1 = fault

1734-IJ Encoder/Counter Module

Message size: 6 Bytes

	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
Produces (scanner Rx)	Channel 0 value of present counter state (LSW)															
	Channel 0 value of present counter state (MSW)															
	PE	EF	NR	0	0	0	0	0	0	ZS	BS	AS	C1	C0	ZD	0

Where:PE = Programming error

EF = EEPROM fault status

NR = Not ready status bit

ZS = Z input status

BS = B input status

AS = A input status

C = Stored data count

ZD = Zero frequency detected

LSW = Least significant word

MSW= Most significant word

1734-IK Encoder/Counter Module

Message size: 6 Bytes

	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
Produces (scanner Rx)	Channel 0 value of present counter state (LSW)															
	Channel 0 value of present counter state (MSW)															
	PE	EF	NR	0	0	0	0	0	0	ZS	BS	AS	C1	C0	ZD	0

Where:PE = Programming error

EF = EEPROM fault status

NR = Not ready status bit

ZS = Z input status

BS = B input status

AS = A input status

C = Stored data count

ZD = Zero frequency detected

LSW = Least significant word

MSW = Most significant word

1734-IM2 Input Module

Message size: 1 Byte

	7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Produces (Rx)							Ch1	Ch0
Consumes (Tx)	No consumed data							

Where: Ch0 = channel 0, ICh1 = channel 1; 0 = off, 1 = on

1734-IR2 RTD Input Module

Message size: 6 Bytes

	15	**14**	**13**	**12**	**11**	**10**	**09**	**08**	**07**	**06**	**05**	**04**	**03**	**02**	**01**	**00**
Produces (scanner Rx)	Input Channel 0 - High Byte								Input Channel 0 - Low Byte							
	Input Channel 1 - High Byte								Input Channel 1 - Low Byte							
	Status Byte for Channel 1								Status Byte for Channel 0							
	OR	UR	HHA	L LA	HA	LA	CM	CF	OR	UR	HHA	L LA	HA	LA	CM	CF
Consumes (scanner Tx)	No consumed data															

Where:CF = Channel Fault status; 0 = no error, 1 = fault

CM = Calibration Mode; 0 = normal, 1 = calibration mode

LA = Low Alarm; 0 = no error, 1 = fault

HA = High Alarm; 0 = no error, 1 = fault

LLA = Low/Low Alarm; 0 = no error, 1 = fault

HHA = High/High Alarm; 0 = no error, 1 = fault

UR = Underrange; 0 = no error, 1 = fault

OR = Overrange; 0 = no error, 1 = fault

1734-IT2I Isolated Thermocouple Input Module

Message size: 8 Bytes

	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
Produces (scanner Rx)	Input Channel 0 - High Byte								Input Channel 0 - Low Byte							
	Input Channel 1 - High Byte								Input Channel 1 - Low Byte							
	Status Byte for Channel 1								Status Byte for Channel 0							
	OR	UR	HHA	L LA	HA	LA	CM	CF	OR	UR	HHA	L LA	HA	LA	CM	CF
	OR	UR	Cold Junction Temperature (Selectable: Channel 0, Channel 1, or Average of both Channel 0 and 1)													
Consumes (scanner Tx)	No consumed data															

Where:CF = Channel Fault status; 0 = no error, 1 = fault

CM = Calibration Mode; 0 = normal, 1 = calibration mode

LA = Low Alarm; 0 = no error, 1 = fault

HA = High Alarm; 0 = no error, 1 = fault

LLA = Low/Low Alarm; 0 = no error, 1 = fault

HHA = High/High Alarm; 0 = no error, 1 = fault

UR = Underrange; 0 = no error, 1 = fault

OR = Overrange; 0 = no error, 1 = fault

1734-VHSC 24V dc High Speed Counter Module

Message size: 6 Bytes

	15	**14**	**13**	**12**	**11**	**10**	**09**	**08**	**07**	**06**	**05**	**04**	**03**	**02**	**01**	**00**
Produces (scanner Rx)	Channel 0 value of present counter state (LSW)															
	Channel 0 value of present counter state (MSW)															
	PE	EF	NR	0	FS	FS	OS	OS	0	ZS	BS	AS	C1	C0	ZD	0

Where:PE = Programming error

EF = EEPROM fault status

NR = Not ready status bit

FS = Output fault status bit - bit 10 for output 0, bit 11 for output 1

OS = Output on/off status bit - bit 8 for output 0, bit 9 for output 1

ZS = Z input status

BS = B input status

AS = A input status

C = Stored data count

ZD = Zero frequency detected

LSW = Least significant word

MSW = Most significant word

1734-VHSC 5V dc High Speed Counter Module

Message size: 6 Bytes

	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
Produces (scanner Rx)	Channel 0 value of present counter state (LSW)															
	Channel 0 value of present counter state (MSW)															
	PE	EF	NR	0	FS	FS	OS	OS	0	ZS	BS	AS	C1	C0	ZD	0

Where:PE = Programming error

EF = EEPROM fault status

NR = Not ready status bit

FS = Output fault status bit - bit 10 for output 0, bit 11 for output 1

OS = Output on/off status bit - bit 8 for output 0, bit 9 for output 1

ZS = Z input status

BS = B input status

AS = A input status

C = Stored data count

ZD = Zero frequency detected

LSW = Least significant word

MSW = Most significant word

1734-SSI Synchronous Serial Interface Absolute Encoder Module

	7	6	5	4	3	2	1	0	
Produce 8	C2ST	C1ST	C2R	C1R	INC	DEC	RUN	I1	Status Byte 0[1]
Produce 9	RES	RES	RES	LHON	IDF[2]	CCE	CCF	SPF	Status Byte 1[1]

1. For detailed descriptions of these bits, see 1734-SSI User Manual, publication 1734-UM009.
2. Monitor IDF to determine the validity of the produced data. If IDF=1, the SSI data is false.

	7	6	5	4	3	2	1	0	
Consume 0	RES	RES	RES	SCMP2	SCMP1	CC2	CC1	LACK	Master ACK Byte[1]
Consume 1	RES	RES	RES	RES	RES	RES	RES	RES	CONS1

3. The master must provide the Master ACK Byte in order to receive the polled Produced bytes 0-9.

1734-232ASC ASCII Module

Default Receive Data Assembly Format (Default Mode)

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5-23	Byte 24
Rx Transaction ID Byte	Status Byte	Reserved	Length	ASCII Data	<CR> (Terminator)

Default Transmit Data Assembly Format (Default Mode)

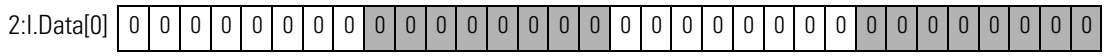
Byte 1	Byte 2	Byte 3	Byte 4	Byte 5-23	Byte 24
Reserved	TX Transaction ID Byte	Reserved	Length	ASCII Data	<CR> (Terminator)

Notes:

Give a Value Its Own Memory Location

When to Use This Appendix

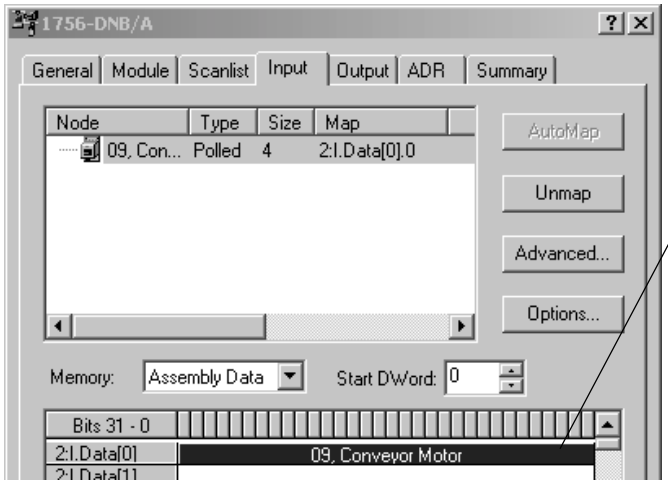
Sometimes, an input or output value for a device may end up encapsulated within a larger tag. For example, a speed value may end up as the upper 16 bits of a DINT element in the scanner. To access the value, you would have to use additional programming.



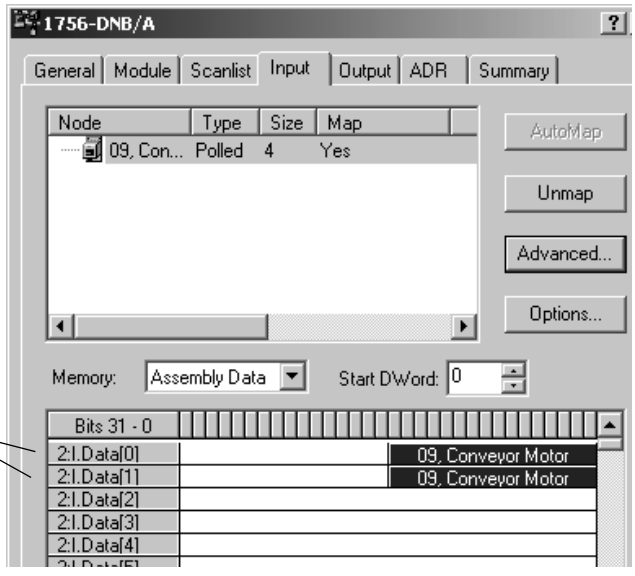
data map for Bulletin 160 AC drive

Instance 70 Data Format (Basic Speed Control Input Assembly)								
Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0						Running1		Faulted
1								
2	Speed Actual RPM (Low Byte)							
3	Speed Actual RPM (High Byte)							

To make your programming easier, re-map the value to its own tag within the data array of the scanner. This lets you access the value without additional programming.



When you use AutoMap, all the data for a device ends up packed together.

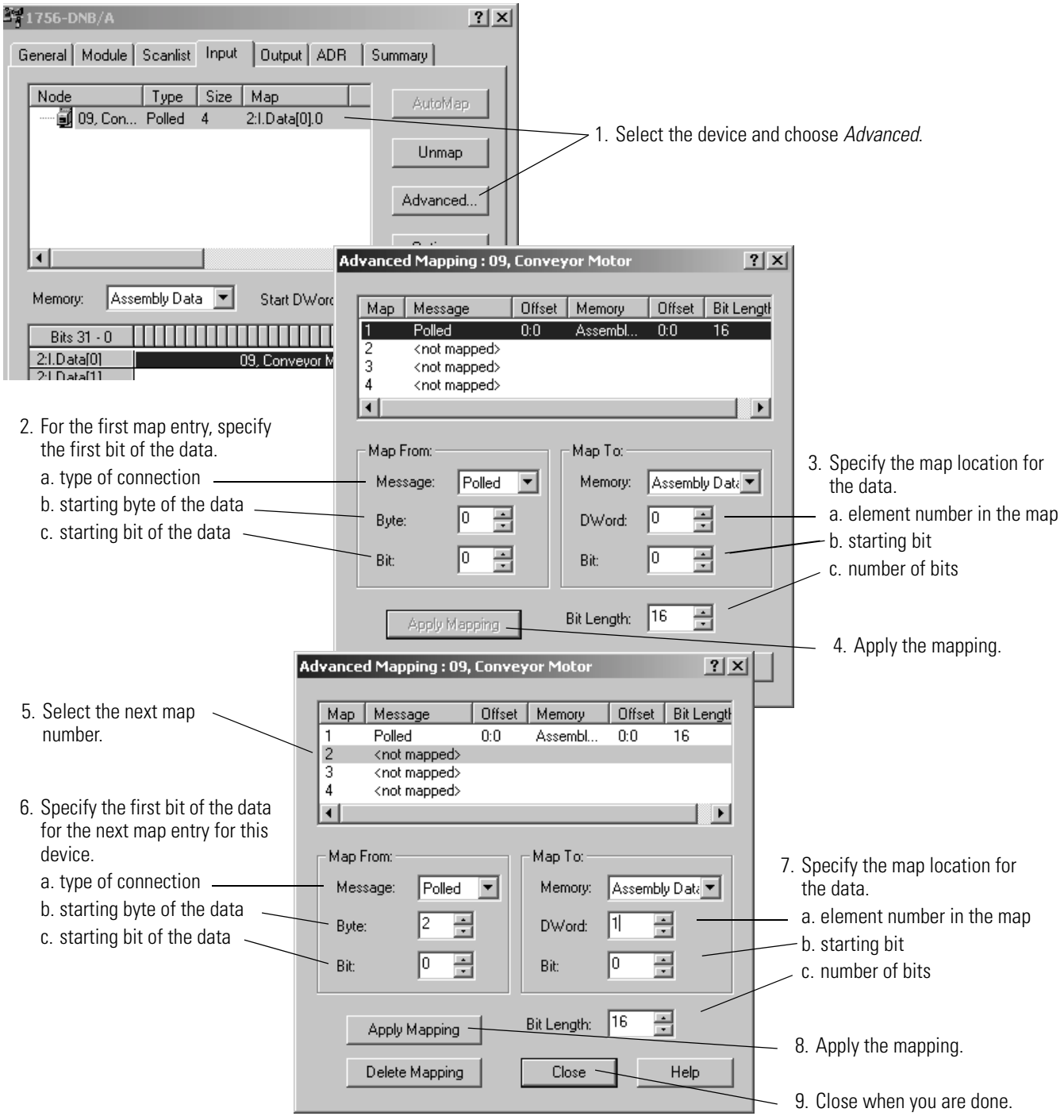


Advanced mapping lets you unpack the data into several map entries.

In this example, the upper 16 bits of the original map entry are now in a individual tag.

Give a Value Its Own Memory Location

To give a value its own DINT in the input or output memory of the scanner:



Numerics

A

B

C

D

L

M

N

O

P

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